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American Forests

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Published monthly by

THE AMERICAN FORESTRY ASSOCIATION

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The American Forestry Association, founded in 1875, is a citizens' organization for the advancement of intelligent management and use of the country's forests and related resources of soil, water, wildlife and outdoor recreation.

Its educational activities seek to bring about a better appreciation and handling of these resources, whether publicly or privately owned, that they may contribute permanently to the welfare of the nation and its people.

In addition to publication of two magazines — AMERICAN FORESTS and CONSERVATION, both designed to keep before the people of the country important conservation questions and issues, the Association carries on educational programs in various fields including forest fire prevention, reforestation, protection of wildlife, prevention of soil erosion, preservation of wilderness areas, establishment of national forests and parks, advancement of forestry by private endeavor, the teaching of conservation in schools and the promotion of research in timber growing and forest utilization.

The Association is independent and non-commercial, and has no connection with any federal or state governments. All its resources and income are devoted to the advancement of conservation in the interests of public welfare. All citizens are welcomed to membership.

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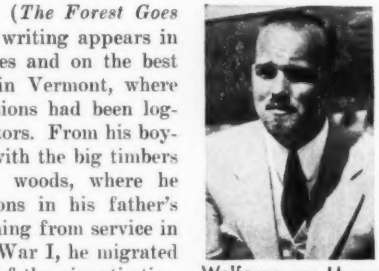
Who's Who

Among the Authors in this Issue

STEWART HOLBROOK (*The Forest Goes to War*), whose virile writing appears in both national magazines and on the best seller lists, was born in Vermont, where his family for generations had been loggers and lumber operators. From his boyhood he was familiar with the big timbers in the New England woods, where he worked during vacations in his father's logging camps. Returning from service in France during World War I, he migrated West—to the country of the gigantic timbers he had heard about. In the Douglas fir camps he worked as whistle-punk, chokerman, time-keeper and scaler—finding the great forests all he had dreamed them. It was at this time that he first started writing—naturally about the forests and lumbering, which he knew so well. After nine years, writing and editing for lumber publications, he started free-lancing and his third book—"Tall Timber"—is just out.



Wolfgang von Hagen

WOLFGANG VON HAGEN (*Central American Cloud Jungles*), explorer, lecturer and author, was born in St. Louis and educated abroad. He has led expeditions devoted to insect and wildlife research into Africa, Mexico and Central America. His latest book, "Jungle in the Clouds," tells largely the story of a Mayan quest for the most beautiful bird in the world. The first complete book in English on Honduras since 1857, it has been put into braille.

Margaret March-Mount

MARGARET MARCH-MOUNT (*Women as Forest Builders*) is a native of Illinois but early in life went to the Pacific Coast. She had yielded to a love of trees when very young and later, seeking an outlet for this devotion, joined the U. S. Forest Service. After ten years at the Washington Office, she went west and has devoted herself to stimulating the planting of thousands of trees in her capacity as public relations agent for the Forest Service. Alias "The Tree Lady," Margaret March-Mount has won wide recognition through her enthusiasm, delightful personality and never-ending zeal for tree planting.

ROBERT S. MONAHAN (*The Alpine Patrol*) writes with authority of this latest development of ski-mountaineering (with a war flavor), for he was—as long ago as 1932—a member of the Washburn Expedition to the Fairweather Range, in Alaska. And he was one of the organizers of the Mount Washington Meteorological Observatory and Radio Research Station, where he spent the winter of '32-33. His adventures during that time are described in his book, "Mount Washington Reoccupied." A Dartmouth man, graduated from the Yale School of Forestry with the class of '31, Bob Monahan joined the U. S. Forest Service and was stationed in the White Mountain National Forest. In '37, he came to the Washington office, where he is now attached to the Division of Information and Education as Publications Editor.

Robert S. Monahan

ERLE KAUFFMAN (*Guayule . . . the "Victory" Rubber*), a native Virginian, writes from Washington. He is an associate editor on the staff of this magazine.

THORNTON W. BURGESS (*Man*), well known author in the field of natural history, writes from Springfield, Massachusetts. An ardent conservationist, Mr. Burgess is deeply interested in wildlife, and especially concerned as to the ultimate fate of the eagle—whose cause he advocates here.

P. P. PIRONE (*Changing Grades Around Trees*) teaches plant pathology at Rutgers and now conducts regularly the department "Your Shade Trees" in this magazine.

THE COVER—"The Forest Goes to War." King planks of Douglas Fir—some of them forty feet long—deck our dreadnaughts.—U. S. Navy Official Photograph.

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BIG TREES

The American Forestry Association is sponsoring a national hunt for the discovery and preservation of the largest specimens of the different species of typical American trees. Locate, measure and nominate your candidate in this competition. ACT NOW to make known and save the largest specimens of America's trees. For further details, send for the Association's special announcement of this Big Tree hunt. Mail your nomination with records and pictures to The American Forestry Association, 919 17th Street, Northwest, Washington, D. C.

UTAH'S OLD JUNIPER

The ancient juniper of Logan Canyon, Utah

THOUGH we associate great size with great age in trees, not all ancient trees are large, for many species never attain great size. This is so with the Utah juniper, *Juniperus scopulorum*, which is also sometimes called Rocky Mountain red cedar.

This species occurs in two forms. The larger grows along the sides of moist canyons, while the smaller form occupies dry rocky ridges or canyon walls. Utah's "Old Juniper," as it is called, belonging to the latter form, is the largest so far reported.

Nominated to the campaign by R. P. McLaughlin of Utah State Agricultural College at Logan, this tree is situated on a rocky ledge overlooking Logan Canyon. Its trunk circumference at base measures twenty-six feet eight inches, and its height is forty-four feet six inches.

Even more remarkable than its size, is the age of "Old Juniper." This the U. S. Forest Service estimates to be between 3,200 and 3,400 years, which would probably make it the oldest living thing in the Rocky Mountains.

Like an old man, the tree shows its years, for during these many centuries it has struggled to withstand the battering winds which have twisted its trunk into a wrinkled pattern of grooves and ridges.

The American Forestry Association acknowledges Utah's hearty cooperation in the big tree campaign, for "Old Juniper" is but one of several large trees reported from that state.

SHOULD the Civilian Conservation Corps be liquidated as "unessential to national defense?"

The time has come to meet this question with military realism. For almost a year now the question has been begged, so far as the war is concerned. In the meantime the Corps has been open game for budgeteers who would scrap it, educators who would change its spots, and social reformers who would lift its face. Small wonder that it has lost its bearings in relation to the war and is headed no one knows where.

Last month the Corps—long the brightest star in Roosevelt's conservation firmament—passed through the valley of the shadow of death. Many anticipated that its death knell would be sounded by the President in his budget message of January 7. Instead, he recommended that its operation be left for determination in the spring when apparently he feels its place in a world at war can be more clearly appraised.

The President's position may well prove of momentous importance because coming up over the spring horizon is a situation that budgeteers, educators, reformers, the whole nation in fact must in the interest of national defense take into account in dealing with the CCC. Otherwise forest resources that are now being heavily drawn on to win the war and that are vital to victory may be without adequate protection during the coming spring and summer fire seasons.

In his January 7 message, the President stressed the necessity of conserving natural resources essential to prosecution of the war. "We must maintain fire protection in our forests," he declared.

World War I took eight billion feet of wood from our forests—enough to build over half a million homes. This war may call for two or three times that amount. Whatever the amount, it is critically important to keep the supply lines from forests to factories and battlefronts unbroken and meeting war needs from week to week until the battle is won.

Forest fire is the arch enemy of these supply lines. It can sever them more quickly, more destructively than any other agency. The season of high fire danger to our forest sources of war-needed wood already is beginning in the South. As spring and summer advance, it will extend westward to the Pacific Coast where our war industries are heavily centered. Already alarm is being expressed in virtually every forest region because military services and war industries are draining the regions of men to patrol the forest and to cope with fires when they break out. In peacetime this would be nationally serious; in world war times with the fire danger heightened by possibilities of bombings and sabotage, it takes on world seriousness.

What, it may be asked, has this to do with the Civilian Conservation Corps and its disposition. Just this. Governmental failure to deal with the Corps with military realism and to decide if, when and how it can be drafted for essential war service, has helped to place our forest resources in this position of potential jeopardy. Total abolition of the Corps will make the situation infinitely worse. This is for the reason that heretofore local and regional forest protection agencies have had the CCC to draw upon as a source of labor and, with that source rapidly drying up, shortage of man power becomes doubly acute.

Furthermore, scrapping the Corps or permitting it to waste away as it now is for lack of essential war work will force local protection agencies to compete with war industries for what men they can get when the fire seasons come. On a wage basis they obviously cannot meet this competition so they will be driven to compete with one another with resultant confusion, delays and disorganization. Forest fires, it must be borne in mind, do not wait for men to organize.

On the other hand, the CCC is already organized and on a national scale. It can canvass the country from ocean to ocean enlisting young men below the draft age and men rejected by the draft. And it can assign them to vital points on the fire lines without delay. Throughout the nation there are thousands of young men below draft age who would like to feel they are helping to win the war. If the CCC were streamlined and given the shoulder straps of an essential war agency, it unquestionably would attract all the men needed to guard our forests and other natural resources.

Demands that the Corps be liquidated because of its cost may now be quite beside the point. As the situation is developing, the issue is rather a question of getting sufficient men at any cost for adequate forest protection this summer. So let it be said again in the immediate interests of national defense that the time has come to consider the Corps not as a social objective but as an established organization qualified by experience to help meet a critical need—the guarding of resources vital to the conduct of the war.

Ovid Butler

Editor.

THE FOREST GOES TO WAR

By STEWART HOLBROOK

U. S. Navy

Battle Decks of Wood

War action is not all on the battle front or in the air or on the sea or in the factories and training camps behind the lines. In the hinterlands of America's forests there is action too and plenty of it. North, south, east and west—wherever forests are "of fighting age and size"—trees and men are engaged in a rear guard drama to supply the Allies for Freedom the tremendous amount of wood needed to prosecute and win a war of world-wide dimensions.

In this article, Stewart Holbrook graphically describes the war scene in the forests of the Pacific Northwest where grows our greatest reserve of timber and from which some of our mightiest trees are being rushed to serve in hundreds of ways in the fight to beat Hitler and his Axis hordes.

In the March issue Stanley Horn, editor of the SOUTHERN LUMBERMAN, will tell how trees of the Southland are answering the war's call for wood.—Editor.

THE grizzled old bullcook paused at his work of cutting fuel for the ravenous camp stoves. He sat down on a big block of fir and scraped his feet through the bright new sawdust that gave the logging camp yard an aroma no man ever forgets. There was frost in the air, this morning, but the sun was up and shining hard on the glittering peaks of the Olympics and it would soon shine into the clearing where we and thirty neat white bunkhouses were dwarfed by the surrounding timber—tall old Douglas fir, rearing its tops two hundred and more feet. I had just asked this veteran of the woods how the boys at his camp were doing in getting out their part of the biggest order for lumber-in-a-hurry that the United States government had ever thrown at the industry. I knew what the figures of this stupendous order were, and now I had gone into the tall timber of western Washington to see what Paul Bunyan's lads were doing with it.

"Mister," said the bullcook, who had felled much timber in his time but is now reduced by age to doing camp chores, "Mister," he said, "you never see such loggin' as now and here. But a man don't count for much any more. The real oldtime logger's day is done. Everything's machine. It was a-goin' that way before Uncle Sam wanted all this lumber so sudden. But now we get some new kind of machine every week or so." He shook his gray head sadly and filled his pipe.

"You've heard of them panzer divisions in Europe, ain't you?" he asked. "Well, we got panzers right here at Camp Six. Everything's panzer. Go on out there in the woods and take a look."

A mile out in Camp Six's timber I found what the old bullcook was talking about. A few rods away in the heavy underbrush I heard the snorting of machinery. The "brush," some of it fifty feet tall and all thick as a jungle, was swaying and heaving as if by some land whale, and suddenly out of it charged a big machine, a tractor, its brightly painted yellow sides gleaming against the black-green of the forest.

This was no farmer's tractor. It was a powerful juggernaut's car weighing more than fifteen tons, and its rear end was a huge steel arch from which dangled a log six feet in diameter and forty feet long. It came out into the open breathing smoke and fire, swaying and churning over the rough ground, while its driver in red shirt and brown "tin" pants, clung to his seat and levers like a trained rider whose body follows every move of saddle and steed.

Roaring like all get-out from its 75-mm exhaust, with the big log crashing, twisting and flattening all before it, the tractor fairly tore across the opening with astonishing speed. In less than three minutes the machine and its load were at the landing. Cat-footed men unhitched the log, then rolled it down skids to an enormous motor truck. This one log made a load, and two minutes later the truck was heading down off the mountain, out of the timber, and so on at forty miles an hour to the tidewater sawmill which, like many others, has been whining day and night without stopping since September of 1940, when Uncle Sam suddenly wanted two billion feet of lumber to house his army in wooden barracks. "The boys must be under cover by Christmas," the Quartermaster said—and so they were, all 1,418,000 of them, sheltered by 2,137,000,000 board feet of lumber, much of it from the Douglas fir belt of Oregon and Washington.

Orville Snider

With the big log crashing and twisting, the juggernaut tractor tore through the timber with astonishing speed. A few minutes later, the log was on a truck speeding to a sawmill

Now, that's a heap of lumber, too much for even a lumberman to comprehend in one pile, but an idea of its size may be had if you conceive the freight train 500 miles long which would be required to move it. What's more, with two minor exceptions, every last stick of it was delivered to the Quartermaster on time.

Getting back to Camp Six, I walked to the top of a small rise and watched the scene below. In and out of the forest charged fourteen other bright yellow tractors, all manned by young men. The woods clattered with the noise, louder than New York's "El," and when one or more of the machines went into a heavy pull, the sound was deafening. It fairly seemed to fill the outdoors. All talking by drivers and ground crews was done by signs.

And then I saw the new machine, already quite fabulous in the West Coast woods, known as The Big Blue Ox. This machine is simply the biggest truck on earth, or so it is said to be and I am ready to believe it is. Built especially for big-time logging, this affair is eighty-five-feet long. It has twenty-eight wheels, eight shifts, and when it is loaded it rolls away with 120 tons of logs.

But the panzer rough riders loaded The Big Blue Ox in little more than ten minutes, and it too started on its way down to the mill with more than one hundred tons of fir. This truck is currently the only one of its size and kind in West Coast timber, but its performance has been excellent and others like it are being made.

The new-type trucks and tractors are only a small part of modern technology in the West Coast woods. Not far from Camp Six I saw something that would have astonished old Jigger Jones, who thought an ax about right for felling a tree. Bellying up to a fir seven feet in diameter were two men. They were husky chaps but they looked small enough beside the gigantic trunk whose top, we estimated, rose two hundred and thirty feet above us.

One of the men held the working-end of a motor-driven saw, the other man directed the far end. They already had cut away the thick bark with axes, and now they set the long sharp blade of the saw against the wood and let it go. The teeth moved rapidly in an endless chain, while sawdust ripped and flew out of the scarf in long curly ribbons—macaroni, the boys call it.

Well, here was a tree that would have taken two

men and a cross-cut saw two hours to fell. By the watch, the big tree's top started to waver, then to lean, in eighteen minutes. The fellers (called fallers) yanked out their saw and ran for their lives. An instant later there was a tremendous tearing sound, like clouds being ripped apart, and the giant came to earth with a resounding crash that sent echoes up the canyon to bounce against the mountain again and again.

Eighteen minutes to fell a monster fir! The hoary tales of Paul Bunyan, the mighty if mythical god of lumberjacks, pale beside what actually is going on in the timber of 1942. The new logging superintendents are mostly college men, trained both as foresters and as civil engineers; they even wear neckties at their work. The new type of crews are top-flight mechanics; the ax and hand-powered saw may soon become as obsolete as the ox.

Down at the droning sawmills, on waterfront and in valley is another army of men with names like setters and doggers and stickermen and feeders. In logging camps and sawmill offices from British Columbia to the California line is still another army, the managers, superintendents, foremen and salesmen, all figuring like mad to meet production demands.

These men of camps and mills are the forest soldiers who have been preparing the United States Army, Navy and Marine Corps for the biggest job of defense America has ever known. They are working in the ghostly half-light of deep forests that were old when Columbus sailed west, the cloud-crashing timber of the Douglas fir belt, timber so fine, so huge and so ancient as to give the dullest lumberjack pause when he strikes ax into the foot-thick bark.

From Camp Six on Puget Sound I ranged southward, and before my trip was done I had traveled four hundred miles through timber. From Canada to the California line these woods resound with the toot of donkey engine, the hoarse roar of locomotives, and the newer sound of tractors and trucks; and the waterfront sawmills drone all day and night. The public, of course, usually thinks of lumber in terms of boards. If the great and sudden demands had been only for boards, the task facing the lumber industry would have been big enough. But it wasn't so simple as that.

An Army Engineer Corps, for instance, wanted, and in a hurry, a large amount of pontoon lumber of a very specific sort. This had to be in planks, three to six inches thick. It had to be kiln-dried, shaped and fitted with metal connectors—stuff designed to take the shock of tanks high-balling along at forty miles an hour. To make this stock required the cream of Douglas fir, and only the cream—straight grained, free from every defect, capable of a bending strength of 1,800 pounds per square inch. Kiln-drying such heavy stock is a difficult job, for the big planks check at the ends during the forced drying.

Happily the West Coast Lumbermen's Association had been cooperating for three years with the U. S. Forest Products Laboratory in the application of a chemical anti-checking treatment called urea, testing it at a number of West Coast mills on lumber items difficult to dry. When the Army order

Red River Lumber Company

In and out of the forest charged other trucks—all manned by young men—and the woods clattered with the noise

West Coast Lumbermen's Association

And then came "The Big Blue Ox"—said to be the biggest truck on earth—eighty-five feet in length, with twenty-eight wheels and a capacity of 120 tons of logs

came through, those mills familiar with the urea treatment were given the job of preparing the big planks. They were ready on time.

Thus a new technique saved the day for pontoon lumber. Of technical interest, perhaps, is that the urea treatment reduced the loss due to checking from forty-five per cent to one per cent. As the old artillery song has it, "The caissons are rolling along," and in this war American caissons will roll across bridgeless rivers on the finest pontoons ever built.

But those first tasks, hurried and huge as they were, were nothing compared to the newer demands our Army, Navy and Marine Corps are making on the lumber industry.

From Hood Canal I first went to Grays Harbor, one of the oldest and biggest logging sections on the West Coast. It is in the fog belt, the country where Sitka spruce grows and grows nowhere else. Never has Sitka been in such demand, not even in World War I. It is often called "airplane spruce" because of its uses in making laminated struts and spars and propellers. Great Britain seemingly cannot get enough of it.

Sitka spruce grows only in a narrow strip along the coast line. It is nowhere nearly so common as fir, cedar and hemlock, and only two large mills have it in any volume. Nor can these two mills produce airplane stock in the amount desperately needed right away. Hence, a brand new type of logger, the Sitka Spruce gyppo, who is busy in the Grays Harbor area.

The word "gyppo" as used here holds no connotation of skulduggery, of gypping anybody. It merely means a small-time logger, something like the sub-contractors in other lines of Defense manufacture. The gyppo's outfit consists of a few tools, a truck and two or three men besides himself. Here is how they work:

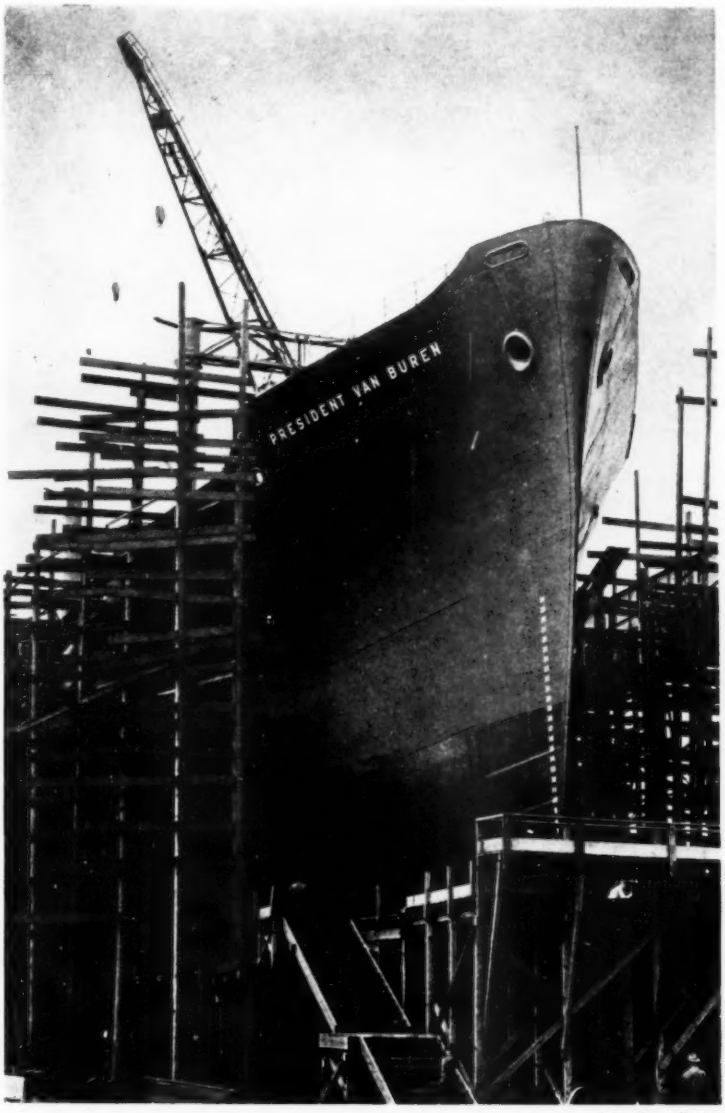
The gyppos set out cruising back roads in their truck, or even on foot, looking for the most likely places for a fine, tall Sitka spruce. It may be standing alone, the only spruce in a stand of fir and hemlock; or it may be in small clumps, if such mighty trees could be said to stand in clumps. Well, they spot such a tree. They know or learn who owns the land. They go to the owner with a proposition—so much for the tree as it stands, or a percentage of what it brings at a sawmill.

Then the boys go to work. They clear a trail through the jungle to the one big spruce, then they fell it and saw it into logs, pile them onto the truck, and away they go to peddle their goods at some mill. Next day they are back cruising again, hunting another big spruce that will yield a few thousand, or perhaps only a few hundred feet of the stuff the R. A. F. wants and can't get enough of.

The Sitka Spruce gyppos aren't the only new thing in the West Coast timber. There's the hoot-owl shift for instance that sends the crews away to the woods at 3:30 o'clock in the morning. Loggers work no longer than they did heretofore. It is still a forty-hour week in the woods. But the hoot-owl is a fire prevention measure, used widely in the summer. Relative humidity, which means the moisture content in the air, is the highest in the early morning hours. It usually begins falling shortly after noon, and that is when the hoot-owl boys call it a day and return to camp. Fewer forest fires to halt productive work and to destroy timber, logs and equipment have been the result. The hoot-owl is certain to be even more popular during the dry months of 1942. It is one of the few methods by which production in the woods can be kept at a high point without increased danger of forest fire.

It is different in the mills, where second and even third shifts are at work; and it is taking these extra shifts to keep up with our own government's demand for unusual pieces of lumber. There's teak, the classic ship material, for example. Just when events abroad cut off imports of Asiatic teak, our Navy discovered it needed a heap of decking lumber in lengths up to forty feet. Now, forty foot decking isn't cut from just any old log. There is little pine in the United States big or long enough, and so the added demand could be met only by Douglas fir. It must be close grained, the very toughest of wood. Present orders added to recent ones indicate the Navy will want some twelve million feet of decking alone in the next year, and the orders are being cut right now in mills on Puget Sound and the Columbia River. They will be ready on time.

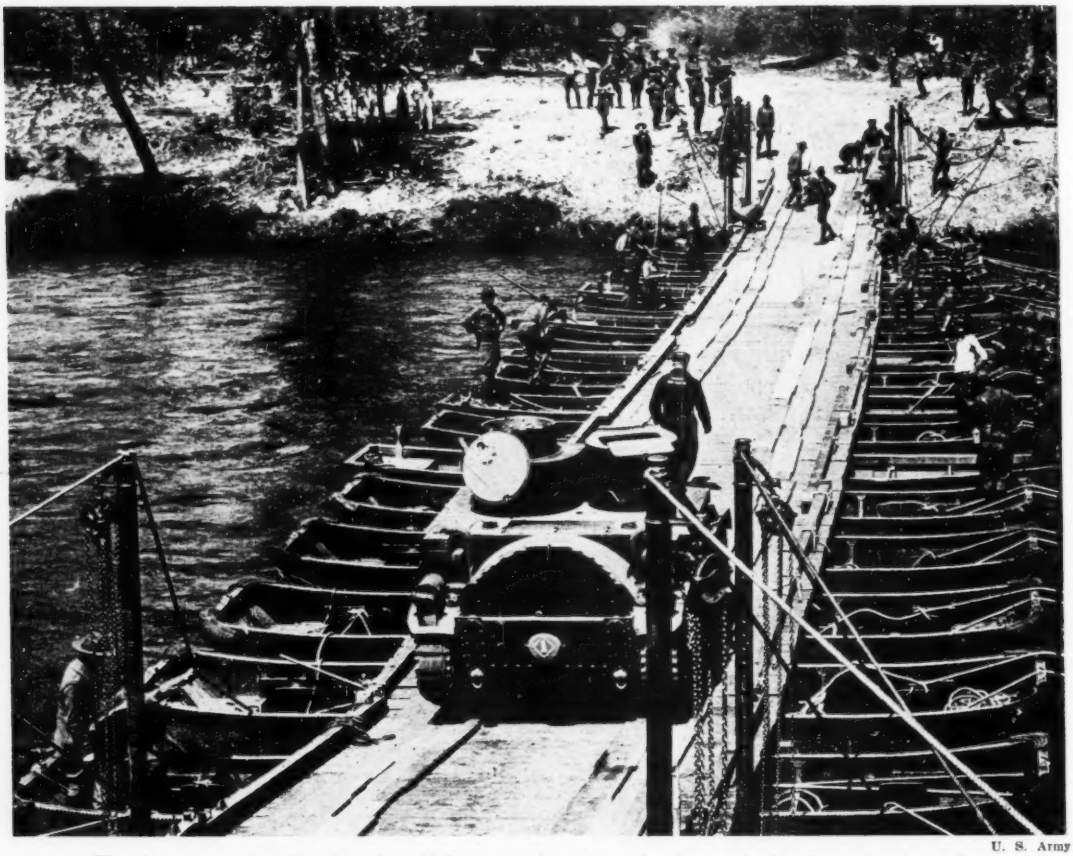
Traveling inland from Grays Harbor I saw something big and long parked beside the two-lane highway. It was a truck loaded with timbers. But what timbers! They bulged my eyes. The men hauling them told me they were each 110 feet long and ten by eighteen inches thick. They were the last of a huge order for keels for the two hundred mine sweepers the Navy is building, and a forester told me that such keels could be cut nowhere on earth except in western Oregon and Washington.



Acme News Picture

From cribs of wood scaffolding the forest is sending cargo ships to sail the seven seas in defense of freedom

Going on to the Columbia River I stopped at Long-



U. S. Army

The forest answers the Army's call for special pontoon lumber—planks three to six inches thick that could take the shock of tanks high-balling along at forty miles an hour

view, the pretty and well laid out town of 15,000, which has the two largest lumber manufacturing plants in the world. Here and at Portland one gets an idea of the diversity of wood products which the government is demanding for Defense and which it is getting in such huge volume. Just a few of the items will give an idea:

For the Navy are some great timbers, twelve by eighteen inches thick, which are going into pontoons used as floats for supporting submarine and torpedo nets. By the piles of this material on the docks and sidings one could judge that our harbors are to be well protected.

Powder and shell boxes. Endless piles of this stuff show that pine, hemlock and spruce, as well as fir, are being used, and cutting the orders is well ahead of schedule.

An entire train of plywood. Much of this is being used for forms in pouring concrete to build or enlarge hundreds of manufacturing plants. Other cars are loaded with stuff to make scaffolding. And trainloads of car stock have been going East to be made into the 120,000 freight cars railroads are building in 1942. The car material market alone is calling for ten million feet of lumber a month—and is getting it.

"Every three tons of lumber used saves a ton of steel for Defense." The raw product from which lumber is made is renewable. Iron ore isn't.

One can get an idea of what wood, plus some clever gadgets, can do in heavy construction at the West Basin plant of the California Shipbuilding Company at Los Angeles. Using patented steel connectors, weighing less than one pound each, at the joints, this huge building was erected on Douglas fir trusses each 116 feet long, and it was put up in the record time of five and one-half hours. You are going to see many more such wooden-truss buildings before the end of 1942. The little metal connectors are making a revolution in heavy construction and are also releasing much steel for other purposes.

At Longview and Portland sawdust wafted on the breeze, night and day. Miles of docks are piled high with lumber for all conceivable purposes. It is the same on railroad sidings. No wonder the lumberjacks smile tolerantly when they read or hear that we live in an age of steel and other metals. First thing their government wanted for Defense was that staggering order for building cantonments. They got it, too, on time. But the jacks were hardly surprised at the order, for their industry is the oldest in America and it

has always been thus through almost two centuries of wars, or since that time in December of 1775 when lumberjacks whacked together forty-odd wooden sleds by which General Henry Knox and eighty-one yoke of oxen hauled cannon overland from Ticonderoga to Cambridge on Massachusetts Bay, to some purpose. Ever since then axes have been swinging behind every American battle, sea or land.

Continuing south from Portland I saw that the green Willamette Valley, usually so quiet and leisure-

diameter. They were moving slowly yet steadily in the direction of the Pacific Ocean, urged on at intervals by flood waters released from splash-dams built for that purpose. Down on Coos Bay these six miles of logs were to be towed to a big manufacturing plant and there made into more things that Uncle Sam wants.

When I saw it late last year, the Coquille drive contained some fifty million feet of lumber—a drop in the bucket of the six billion feet the government alone will need in 1942.

New York Daily News — Forest Service

The forest goes to war in manifold ways. Here (above) lumber has been rushed to a distributing terminal in New York Harbor for defense construction in that area, and (below) it is meeting the call for emergency war buildings in the Nation's capital

ly, was fairly hectic with life and hurry. Back in the foothills from both sides of the Pacific Highway every last little peckerwood sawmill was steam up and saws biting into timber that was big and tall when Lieut. U. S. Grant was fighting Indians in Oregon.

Still heading south I came to a fork of the Coquille River and saw a sight not often seen here or elsewhere these days. For six solid miles the river was filled from bank to bank with Douglas fir logs—great handsome logs, three feet, six feet, even eight feet in

But the bucket is being filled. Up and down the wilderness back from the shores of Coos Bay and along the banks of the Umpqua River in Oregon—snowy now—men with clothes stiff from pitch are swamping out trails that will be trucking roads by early spring. Along these trails hundreds more husky men are standing up close to gigantic columns of fir and of cedar, saws in hand. It isn't long these days before a tall tree shudders briefly, then goes crashing down to silence in the snow.

Most Americans, I know, think of Defense produc-

tion in terms of the murk of smoky steel towns, where fitful fires of Bessemer converters and open hearths light the scene. Steel is drama, all right, and so is timber. Out there on the big white blanket in the high hills, snow to their ears, against a background of black-green forest, the jacks—the forest soldiers—are working fast and dangerously among timber taller than most city buildings, and when a tree comes to earth a small quake shakes the hills.

This new-style jack lives like a god, compared to the jacks of twenty, even ten years ago. The big old bunkhouses are in the past. Four men live to a house, a very neat house that has good beds with white sheets that are laundered weekly. He has a locker for his clothes. There are shower baths, flush toilets, electric lights. Swing bands waft out of a hundred camp radios in every community. Married men have their families in camp, and also their cars, for a good road leads to most West Coast logging operations these days.

Newspapers, which used to come once a week if at all, now arrive on the day of publication. A school, a church, and a large store round out what still is called a logging camp but is really a complete community, with a social hall, a movie theatre, and in at least two instances a traffic policeman on duty during the evening.

A few oldtimers weep about the changes. "Sweet, dyin' old American. . ." I heard one remark with fine sarcasm, "Can't we have television, too?"

The new-style jack eats food fit for kings. No industrial workers in the United States get so much or so good food. Two meats every meal, two vegetables, fresh fruits in and out of season, often turkey and ice cream, and a host of pies and pastries. Once in a long time, just for oldtime's sake, the cook will make up a batch of baked beans.

Working conditions are excellent and get better every year. Wages are high, though not high enough to suit some of the workers, but when since history began were wages high enough? In the camps and mills, as elsewhere, two labor unions vie for favor, and on occasion jurisdictional and other strife occurs. On the whole, however, the lumber industry has come through the Defense boom to date with very little labor trouble, compared to the record in many other industries.

In the meantime, government buying of lumber has long since passed through its wild and woolly stage, where one department bid idiotically against another, and is now centralized, as it should have been from the first—what with M-Day plans worked and reworked since 1918. Price ceilings have been set and they are effective. Results of the stockpile and centralized buying have resulted in an orderly market, prompt deliveries and—mark this—no shortages.

Will the sinews of men and the wheels of machinery stand the terrific pace set more than a year ago and still going at top speed? No tougher breed of man exists than the logger, and the sawmill man is not far behind. Donkey engineers and tractor drivers are sitting up nights in the timber, working by lantern to keep their machines in order for the morning. Down on the sandspits on tidewater, where the whine and drone of band saws never cease, those whirling strands of glittering metal with their hungry teeth are running as they never ran before. Like the immortal Casey Jones, those men of the camps and mills, I have a conviction, will "keep her running 'til she leaves the rail."

ARMY MAKES RECORD-BREAKING LUMBER PURCHASE

In preparation for increased defense construction activities under the Victory Program outlined by the President, the Army early in January announced the purchase of 750,000,000 board feet of lumber, enough to make up a freight train 300 miles long, comprising more than 30,000 carloads. This purchase, to meet Army requirements up to May 15, is believed to be the largest transaction of its kind on record for any single buying agency, public or private. The purchase was handled by the Materials and Equipment Section of the Construction Division, Office of the Chief of Engineers.

With nearly ninety different sizes involved in the transaction, the lumber was bought under the auction system established by the Army nearly a year ago for the central purchasing of large quantities of defense materials. Under this system, bidders assemble at central locations in producing areas normally serving as delivery points—in this case New Orleans, Seattle, and Richmond, Virginia—where the Army's lumber requirements are placed before them. At New Orleans, 330,000,000 board feet were purchased from 290 bidders; at Seattle, there were 207 bidders for 225,000,000 board feet; and at Richmond, 152 bidders for 180,000,000 board feet.

More than 800 lumber concerns are doing business in this manner with the War Department, it was announced. Because of defense construction needs, the Army has become the sole source of orders for lumber in large amounts. The magnitude of defense purchases of lumber may be realized from the fact that, with these new orders, the total amount of lumber bought by the Army during the past year is 3,000,000,000 board feet, or more than forty-five per cent of the 6,500,000,000 board feet required for the first World War.

According to the National Lumber Manufacturers Association, there are 7,000,000,000 board feet of lumber in the retail yards of the country at the present time, and an additional 6,000,000,000 feet at the mills. Much of this stock, however, will not meet size requirements in the record-breaking transaction, and an undetermined amount must be cut to order.

In connection with the purchase of this lumber stockpile, the Army at the same time bought 400,000 kegs of nails.

WOMEN AS FOREST BUILDERS

By

MARGARET MARCH-MOUNT

One of the forests of "Penny Pines" planted throughout the nation by the General Federation of Women's Clubs

NO LONGER is forestry wholly "a man's profession." The wonder-world of the forest is now a woman's world also. In many parts of America women may not know their trees, but they are becoming acquainted with the forests and their role in peace and in war.

As part of the club curriculum, women now have a way of going to the woods on their own with scientific foresters as guides, philosophers and friends. Thus armed with first-hand facts, they carve out careers at home. Through a less scientific approach, women are creating "a better sense of humus," working more along the human side of forestry. Unhampered for the most part by technical knowledge, they have placed emphasis not so much upon the factual as upon what trees mean to our way of life.

In this grim era of bombs versus bread and butter, women look ahead to the time when war will cease to impoverish the people, and they may grow all-out crops on protected soils to feed hungry populations. Then there will likely be a demand for wood for new homes, churches, schools, offices, ships and factories such as no one has yet grasped, in

Honoring the dead while serving the living—the American Legion Auxiliary is planting "Forests of Memory." Here two such forests in Michigan are being dedicated

order to restore and eventually surpass conditions that normal folk now hold dear.

Realizing that a more equal sharing of raw resources will become a condition of peace, numbers of alert women are pursuing forest studies, fitting themselves for a chair at the peace table.

As far back as 1896, tree planting was part of state charters in the General Federation of Women's Clubs. A modern version, "penny pines," was initiated by Mrs. Edward LaBudde, of Milwaukee, during the George Washington Bicentennial in 1932. A cooperative agreement was made between Federated women and federal foresters to reforest 640 acres of barrens in the Nicolet National Forest of Wisconsin. The project got off to a good start with a check for $100 from the daughter of a pioneer lumberman and a penny from the Federation editor. At about the same time, the Minnesota Federation started a memorial forest in honor of George Washington, and soon the American Legion Auxiliary began planting a "Forest of Memory" in the Wisconsin north woods, honoring the dead while serving the living.

Women are taking a leading role in establishing School Forests—and here one is being dedicated

There is no copyright on alliterative "penny pineries." They have captured the imagination of tree lovers everywhere who wish to be more aggressive than sentimental—to do something tangible. In 1936 the American Legion Auxiliary inaugurated memorial forests from ocean to ocean, and the General Federation of Women's Clubs set as a goal a Federation forest in every state in the Union. The women volunteered the money, sometimes from slender personal and official budgets; the foresters furnished the sites, seedlings and supervision, and erected a rustic sign sometime between inception and dedication. The Civilian Conservation Corps

Daughters of the American Revolution dedicating one of their many Jubilee Forests, this one in Illinois. The D.A.R. has planted more than 5,000,000 young trees in thirty-eight states and the District of Columbia

and local young men planted the trees.

High on the tree planting horizon are the Daughters of the American Revolution. While conservation, human and natural, has long been a part of their achievement, it was novel to begin a partnership with Uncle Sam in 1936. As Mrs. Avery Turner of Texas, then national conservation chairman of the D.A.R., expressed it: "The work is so big, so inclusive and important that we need the help of our government, and we need to assist it in every way possible." Since then the D.A.R. insignia and the Forest Service shield have gone far together.

Mrs. Turner promptly published "The Five W's and How of Cooperative Memorial Forests" in the *National Historical Magazine*, and in 1938 "Planting Trees to Observe the D.A.R. Golden Jubilee" by Inez S. Warthen, chairman, Conservation Committee, National Society, Daughters of the American Revolution; and Helen W. Gordon, U. S. Forest Service, announced a procedure to help underwrite a permanent and more prosperous civilization by planting trees on forest lands in state or federal ownership.

While the D.A.R. expects no special tribute, it is heartening to know that no fewer than 5,000,000 little trees were planted in thirty-eight states and the District of Columbia.

At the top of the scroll in numbers of acres is the Illinois D.A.R., which in 1939 voted "to reforest 1,000 acres in the Shawnee National Forest." Through many days and nights of ardent devotion by Mrs. James W. Twitchell, Jubilee chairman, and her colleagues, a region in the Ozark foothills, rich in historical associations, but poor economically, was treated not only to $4,000 worth of trees, but to a bonus of 100,000 treelings. Dedication ceremonies were held between the rustic sign of the Forest Service and a huge boulder of native stone, gift of Mrs. William Butterworth, honorary vice-president general. A copper tablet bears the inscription "and the leaves of the tree were for the healing of the nations."

(*Continuing on page* 92)

Markers that are becoming increasingly significant throughout the land. Here is one for pine in the Ozarks

THIS MEMORIAL FOREST OF SIXTY
ACRES WAS PLANTED IN 1940 WITH
ENGELMANN SPRUCE TREES BY THE
FOREST SERVICE, U.S. DEPARTMENT
OF AGRICULTURE WITH FUNDS
CONTRIBUTED BY THE COLORADO
DAUGHTERS OF THE AMERICAN
REVOLUTION BECAUSE OF THEIR
INTEREST IN CONSERVATION AND
DEDICATED BY THEM TO THE
MEMORY OF
EUGENIA McFARLANE ADAMS
VICE-PRESIDENT GENERAL 1938-40

In the Colorado Rockies, sixty acres of Engelmann spruce dedicated to the memory of a tree-loving D.A.R. official

In Virginia, young trees planted as a "living memorial" to the framers of the Constitution of the United States

A Glimpse Into

THE FORESTS O

Photographs from the Dr. Harry Nichols Wi

When the fury of modern warfare descended upon the Philippine Islands early in December, it struck through a land rich in tropical forest and plant life. More than half of this mountain-studded archipelago is covered with trees, including many valuable hardwoods. Known flowering plants and ferns exceed 10,000 species.

A thousand different woods growing in the irregular masses of hills and mountains of these islands have a commercial value. These forests are of five types—the dipterocarp, which covers seventy-five per cent of the forest area; the molave, covering ten per cent; and the pine, mangrove and mossy types. Forests of the dipterocarp family form the predominating timber trees of the Islands and are extremely interesting in character. They consist of several stories, the first occupied by very large trees, under which is an understory of small trees of great variety; below these are still smaller kinds of trees and a heavy growth of herbs and shrubs;

This cedar rises from the lush floor of a Philippine jungle, one of the Islands' thousand valuable tree species

In these wild forests of Bataan Province, north of Manila, American and Filipino forces are holding fast

HE PHILIPPINES

ction. Courtesy of the Yale School of Forestry

over and through the whole runs a tangle of vines, chiefly rattans and climbing palms.

The molave is one of the hardest and most durable woods of the Islands, and grows in comparatively open stands. The pine forests occur in the high mountainous region of northern Luzon; the mangrove forest is found on the tide flats and at the mouths of streams; and the mossy forests are of no commercial value, their importance being chiefly as a protective cover to mountainous slopes.

According to press dispatches, most of the fighting has been on the principal island of Luzon and on Mindanao, the volcanic jungle which is the archipelago's second largest island. The heavily bombed capital city of Manila, on Luzon, has fallen to the Japanese, but to its north, on the forested mountain slopes of Bataan Province, American and Filipino forces, as this is written, are holding fast. In a similar wild forest region forty years ago Aguinaldo long held out in guerilla conflict with the United States.

The strangling fig is a familiar sight to Filipinos. With it in the forest jungle are 10,000 plant and fern species

Even though cut over, the forest in Mindanao, the archipelago's second largest island, is still a jungle

WAR DEVELOPS A NEW TECHNIQUE IN PROTECTING VITAL NATURAL RESOURCES AND—ON THE SNOWY, HIGH PLACES APPEARS . . .

NOT ALL skiers in the national forests this winter are pleasure-bent. Flying blades of hickory and thongs of rawhide pulled taut across rings of bamboo or metal are etching a significant drama of military preparations upon the great white blanket covering the forests of the snow country.

Skeptical travelers among the rugged peaks of central Utah may be puzzled by ski tracks starting from nowhere and "herring-boning" up the nearest slope. These tracks symbolize the pioneer maneuvers of a parachute company which started testing in mid-January the practicability of air-borne ski troops in the Wasatch National Forest. But unlike the conventional ski jumper whose skis remain attached while he rockets from the take-off to the steep landing hill, Uncle Sam's 1942 fighting parachute corps will not wear their skis while jumping. Just as Uncle Sam's "smoke jumpers" in the Forest Service receive their fire-fighting equipment and supplies by cargo 'chutes, so skis, ski poles and material for winter operations are dumped separately over ground targets.

Such a service of supply is not so simple as it may sound. Through the years the Forest Service has smoothed most of the wrinkles in cargo 'chute deliveries to fire camps in remote sections of the national forests. There is a vast difference, however, between parachuting the fairly durable tools used by fire fighters and such relatively fragile items as skis and poles. Outfitting a warm weather camp with bed rolls and tent flies is quite a different problem from stocking a high-altitude camp in sub-zero weather.

If this extensive Forest Service experience, supplemented by methods developed by alpine explorers to outfit advance camps from the air, can be expanded through Army tests into effective air delivery of ski-clad parachute troops, the United States will have

Skis are etching a significant drama of military preparations upon the white snow blanket covering western national forests as Uncle Sam develops alpine troops for the first time

THE ALPINE PATROL!

By ROBERT S. MONAHAN

Photographs by U. S. Army Signal Corps

wrought another miracle in a war which knows no impossibilities.

Rainier National Park, in Washington, and the adjoining Snoqualmie and Columbia National Forests are providing the rugged terrain needed to train the 87th Infantry Mountain Regiment based for the present at nearby Fort Lewis. The First Battalion in this regiment, which is without precedent in the history of our armed forces, was organized in November as "an experimental force intended particularly to test organizations and equipment to meet the unusually rigorous requirements of military operations in mountain terrain." The National Ski Association and the American Alpine Club are cooperating closely with the War Department in recruiting and equipping what should soon become an outstanding component of the Fourth Army.

Last winter the Forest Service, at the request of the Acting Secretary of War, recommended thirty camp sites and maneuver areas suitable for training

This is not a fair weather war and our troops must be trained and equipped to fight when the going is toughest. They are getting both in the white hinterlands of the forest

such battalions in the complexities of modern high-altitude and cold weather warfare. How many of these national forest sites may be occupied with alpine troops depends, of course, upon the progress of the war, but it is a safe assumption on the basis of its record that the War Department will overlook no opportunity to train and equip adequately this unique branch of its armed forces.

The War Department has already purchased for actual service this winter 45,000 pairs of skis and 25,000 pairs of snowshoes, further evidence that our troops will not be snow-bound if winter comes to our battle lines. Much of the ski and snowshoe equipment acquired previously by the Quartermaster Corps was intended primarily for recreational purposes, but like the squirrel hunters of other wars, ski-wise soldiers of the present conflict may find their avocation transformed to serious business.

The ingenious sno-motor, originally developed by the Forest Service Equipment Laboratory at Portland, Oregon, for transporting heavy material up steep snow slopes in the Mount Hood National Forest, was purchased by the War Department for initial tests last winter. One of its "sister tanks" based at Sun Valley, Idaho, proved an ideal cargo carrier for motion picture equipment when the training film, "The Basic Principles of Skiing," was photographed for the Signal Corps last May in the Sawtooth National Forest.

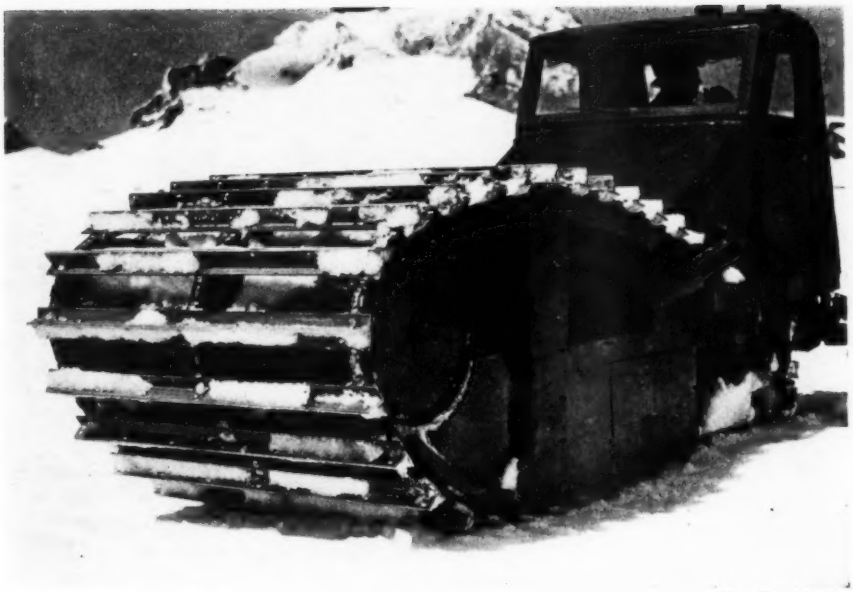
The long snow seasons characteristic of many national forests in the high country make them ideal proving grounds for cold climate equipment. Last May a testing board of Army personnel, Forest Service officials and civilian experts arranged performance trials of various types of motor toboggans in the Tahoe National Forest, California. Modifications in the most promising basic design were made during the summer in the Forest Service Equipment Depot at Stockton. By September 6, enough old snow remained at the 10,000-foot level of Mount Shasta in the Shasta National Forest for final tests. The following month a shipment of these high speed "motorcycles on snow" was completed for Russia, where they may even now be staging a blitz of their own.

In a war which knows no impossibilities, tests are being made with ski-clad patrols delivered by parachute, after the manner of parachuting forest fire-fighters

Last winter about 42,000 visits were made by skiers to the popular Berthoud Pass and Loveland Basin winter sports areas on the Arapaho National Forest of Colorado. This winter the surge of gaily dressed skiers from Denver seeking week-end invigoration at these popular ski centers is swelled by long olive-drab convoys of soldiers from Lowry Field also in need of a change from rigorous wartime routine.

The same story of recreation trips organized by the Army to spice the normal routine of military life is repeated across the national forest system from the vicinity of the White Mountain National Forest in New Hampshire, where the First Corps Area planned to acquaint 1,000 soldiers each week

with the rudiments of ski technique, to the Chugach National Forest in Alaska, where cabins have been built at Summit Lake as ski training and recreation objectives for soldiers quartered near Seward.



U. S. Forest Service

The ingenious sno-motor, developed by the Forest Service for transporting heavy material, is being tested by the Alpine troops

Again this winter the mountain retreat built by the Sacramento Air Depot near Donner Summit, on the Tahoe National Forest, offers a change in scenery for pilots, weary from training field tension, who thus become familiar with deep snow conditions—experience that has already served some of them in good stead after forced landings in the snow country.

At Ogden, Utah, a patrol of twenty civilian ski-mountaineers is training under Alf Engen, America's "Iron Man of Skiing" by virtue of his winning in 1940 and 1941 the exacting National Four-Event Championship. Engen, a CCC foreman on the Cache National Forest, is assisted by Ogden Ski Club President F. C. Koziol, of the Intermountain Regional Forest Service Office, and by Clark Anderson, Ranger on the nearby Cache Forest. In less than two hours this group of resourceful skiers can take to the heights well prepared to cope with emergencies, especially aircraft disaster, that may occur during any kind of weather in the Wasatch Mountains. In this wild and rugged country winter travel except by skis or snowshoes is impossible.

U. S. Forest Service

A blitz on snow is the promise of the motor toboggan perfected in the national forests and now being used by the Russians

Throughout the country other ski patrols have quietly prepared for winter duty under the efficient leadership of the National Ski Patrol System which was requested as early as November, 1940, by the Chief of Staff, General Marshall, "to become fully familiar with terrain . . . . to perfect an organization prepared to furnish guides to the Army, in event of training or of actual oper-

(*Continuing on page 96*)

GUAYULE . . . THE "VICTORY" RUBBER

By ERLE KAUFFMAN

Ten per cent rubber is this wild shrub. In cultivated plants the content is doubled

With the road to Singapore, rubber capital of the world, now under Japanese bombs and guns, the United States, greatest rubber consumer, is embarking upon a program to grow its own. Cut off for an indefinite period from all rubber imports from Asia, and facing a war production program unparalleled in history, less than 700,000 tons of rubber are on hand, about the amount required for one year of normal use. If this tonnage is used only for military and other vital purposes, it will last somewhere around thirty months.

Means of developing every possible source of rubber supply in the United States are therefore being energetically pursued. These include factories to produce synthetic rubber, improving methods to reclaim and utilize old stocks, encouraging shipments from Latin America and, probably the most important at the present time, the planting and processing of the wild rubber shrub, the guayule plant.

Definite steps have already been taken. While the Supply Priorities and Allocations Board was approving a three-fold increase in the present synthetic rubber program, the Senate Military Affairs Committee was recommending legislation empowering the Secretary of Agriculture to provide for the planting of 45,000 acres of guayule "in order to make available a domestic source of crude rubber for emergency and defense uses." The Committee's action followed introduction in the Senate, on December 22, of a bill, S. 2152, by Senator Downey of California. On January 5, Representative Anderson of California, introduced a smiliar bill, H. R. 6299, in the House. This bill would provide for the planting of "75,000 acres of guayule or other rubber-bearing plants."

In substance, both bills authorize the Secretary of Agriculture to acquire the right to operate under patents, now held by the Intercontinental Rubber Company, relating to the planting of guayule or the extraction of rubber from it, and to acquire such properties and processes as are necessary to such operation. Actually, the federal government would take over and operate the nurseries, planted acreage and processing plant of the Intercontinental Com-

Guayule, somewhat like sagebrush, is a desert plant of southern Texas and northern Mexico

pany in the Salinas Valley of California. Furthermore, and vitally important to the whole project, the government would acquire the only large supply of improved guayule seed in existence—about 23,000 pounds, enough to plant 50,000 acres. This supply of seed has been developed through experimentation over a period of thirty years and, it is claimed, will produce plants with from two to three times as much rubber content as the wild guayule shrub.

But even with this ample supply of improved seed, guayule cannot be expected to perform the miracle of relieving the present rubber emergency. It is a practicable and reasonably efficient but limited source of rubber. It produces a product acceptable to rubber manufacturers and usable without alteration of manufacturing machinery. It can be grown, harvested and processed at costs not unreasonably high, but substantially higher than the costs of producing rubber from the Para rubber tree in the American tropics. Its present value lies in the fact that it can be harvested and processed from four to five years after field planting, a considerably shorter cycle than the Para tree. In fact, it is possible to harvest guayule from one to two years after field planting, but with a corresponding reduction in rubber content. An acre of the improved strain of guayule will produce 900 pounds of rubber in two years, 1,600 pounds in four. It is estimated that 45,000 acres, as called for in Senator Downey's bill, will produce 33,000 tons of rubber four years after field planting, or slightly better than five per cent of the nation's normal yearly consumption. Looking at it from a purely military standpoint, 45,000 acres in five years, including the nine months necessary for the pre-sprouted seed to develop in nurseries, would supply the rubber requirements for war production for one month.

This figure is not as unimpressive as it may seem, however. The 45,000 acres in question represents but an initial step in the utilization of guayule to help meet the nation's critical rubber situation. They represent acres in the great Salinas Valley of California where the cultivation of guayule has been in process for many years, and acres, though limited at present, on which the rubber-bearing shrub is already growing. Just how many additional acres are available for planting in the Valley, (*Continuing on page* 84)

From wild plants and with crude extraction methods natives of Mexico have been producing up to 4,000 tons of guayule rubber annually for many years. The United States, with cultivated plants and modern extraction processes, now facing a critical rubber shortage because of war in the Pacific, is looking toward a vast guayule rubber project producing thousands of tons

CENTRAL AMERICAN CLOUD JUNGLES

By WOLFGANG VON HAGEN

Photographs by the Author

The jungle of the sky is bathed in clouds, wetted by ceaseless rains. Here 6,000 feet above sea level are thickly massed trees, orchids, brilliantly colored birds and enormous butterflies

JUNGLES are generally pictured as dark, mysterious lowland regions steeped in primeval ooze, fringed with mangroves and drained by murky rivers in whose pallid whisperings lurk eels and alligators. But in Central America there is another kind of jungle—a jungle not of the lowlands, but of the skies, where water plunges down in silver cascades, where there are neither eels nor alligators, but where there are orchids, mosses, tree ferns, brilliantly colored birds and enormous butterflies. These jungles thrust their verdure-covered heads 6,000 feet into the air, so high that they become the nesting place for heavy white masses of Carribean clouds.

I saw my first cloud jungle, as they are called, while searching for the long-tailed, golden-green quetzal bird in Honduras. Only after riding for days through forests of pine and oak, occasionally dipping down into warm verdure-splashed valleys, did I realize that three-quarters of this Central American country was 3,000 feet or more above sea level. There

were many tall peaks, endless waves of mountains which, from a distance, appeared to be grey waves of the sea rolling in endless undulations. And that precisely is what the first Spanish explorers thought, since they called it Honduras, or *Hondo-deep*, land of great depths.

I climbed to the cloud forest with Chon, whose dark eyes had a slight mongoloid tilt, suggesting that he was part Indian. Chon was an agriculturist, growing corn, beans, coffee and cane. He knew the rain forest of the Sierra de Pijol that rose out of the Valley of Subirana in central Honduras, for it was there he gathered palm leaves as thatch for his mud-block adobe home. In the cloud jungle he also hunted and gathered the sticky sap of the liquidambar tree or the sharp-pronged vines of the sarsaparilla.

Chon walked slowly up the winding path, swinging idly at hanging vines with his sharp-edged machete. I followed, just as slowly, so as not to put too great a strain on my heart. Already it was beating like a trip hammer. Grey-green mass-like Tillandsia

Water dripping from thousands of parasites above trickles into rills, which become small streams

There is no winter in the cloud jungle, but near-freezing weather at night calls for protection, —so Chon starts building us a lean-to

hung from the trees, giving the forest a strange venerable aspect. The pines thinned out at 4,000 feet and the white ghostly stems of the cecropia began to appear. Soil became dark, heavy and padded with humus. When we broke into the cloud-level the sun disappeared. The blanketing masses of forest are bathed in fog and mist the year around and, in consequence of a ceaseless precipitation of rain and mist, there are developed in riotous succession hosts of moisture-loving plants, both on the ground and the epiphytic-filled trees. From this section upward the jungle became suddenly thick.

Immense cedars, roble-oaks, gums and sapotes formed an almost impassable phalanx of verdure. It was like some matted wilderness buried in immense gloom. Wild fig trees,

Cloud jungles rise out of the dry pine and oak regions of Honduras where there is scarcely more than a foot of rainfall a year

called *matopalos,* or tree killers, embraced other trees, encircling them with crushing vine-tentacles. Giant trees arose upward carrying parasites, mosses, ferns and snake-like lianas that twisted about them.

There is no winter in this forest. The greens are eternal. Although the climate is oftimes cold, sometimes near freezing, the sleep of winter is unknown. Immense trees which the arms of eight men could not girdle, shoot into the sky where the crowns of green disappear in the low-lying clouds. Here are giant mulberries, the Morus, with greatly elongated but inedible fruits. Drimys, a relative of the magnolias, with its glaucous leaves and pungent bark, fill the dank morning air with a sweet scent.

Big trees crowd out the little ones; parasites and orchids cling to the limbs. Vines, as thick as my wrist, wind up the trunks and stretch from tree to tree, binding the cloud jungle like the woof of a carpet. Out of this mass of lichen-covered trunks swathed in epithytic clusters there was only one species I could instantly recognize—the liquidambar. These large-trunked trees are tapped by the *ladinos,* just as one might tap a maple for its sugar or a pine for its rosin. The liquidambar yields a yellowish fragrant balsamic liquid which exudes from the trunk when it is properly cut. It is the only commercial reality—*gracios a Dios*—in the whole rain forest.

The higher we climbed, the deeper we penetrated into the forest, the thicker became the jungle. The multiplicity of the plant-forms was bewildering. Trees did not grow in clusters like sycamores, pines and oaks; each tree here seemed to be different. And here something was brought home to me. The more untouched by man, the richer in variety is Nature. Multiplicity of form is the essential characteristic of Nature; uniformity, that of man.

At times the jungle is suddenly blotted out by blankets of heavy white clouds settling down. This whole atmosphere remains at a constant saturation point. Rain hangs like unshed tears. The equipoise between mist and rain is so delicate that anything, a falling tree, the slightest change in the barometric pressure, is enough to cause it to rain. The mist seems always to be falling and a temperature of fifty-eight degrees in mid-day does nothing to remind one of the tropics, despite the bewildering tropical verdure.

Water tinkles and plops ceaselessly. Everything oozes. Every branch and trunk is swathed with epithytic growths. The sodden earth is covered with a deep mulch of leaves and everywhere I stepped there were mosses, hepaticas and lichens which peeped out from the fallen leaves. All were as saturated as wet sponges. The ground is never dry. These infinitesimal drippings grow into trickling rills that gush into streams, and these cascade down from the cloud forest to the arid plains below.

Cloud jungles such as these are distributed on many ranges from Mexico southward through Guatemala and Honduras, down into Panama. Wherever conditions of altitude, climate and humidity—with saturation and coolness—prevail, and wherever these verdure-crowned mountains receive the genial moisture-giving rain clouds of the Caribbean, there will be found the cloud jungles. It is almost paradoxical that arising out of the dry arid pine and oak regions, where there is scarcely a foot of rain a year, will be the cloud-forested areas, where precipitation will exceed 200 inches yearly.

What remains unsolved is the distribution of life in these cloud jungles. They will be separated by hundreds of miles from other similar ecological zones, yet all will have identical floral and faunal forms.

The chirping of the brown tree-frogs gives out a sound as if hundreds of hammers are violently striking an empty cask. Cicadas fill the jungles with a vibrant clatter. Large blue morphos flutter easily through the labyrinth of the trees, while long-winged giant dragonflies rise like heliocopters to the higher reaches of the forest.

Birds are everywhere. Toucans with their ridiculous beaks bend down to peer at us. Woodpeckers sink their pneumatic drills into the dead trees while the *mot-mots,* purposely nibbling away their tails until they are racket-shaped, dive and spin in mid-air. *Hilgeros, trogons, cotingas,* ant-birds, *mot-mots* and all the other avian inhabitants of these regions remain within fixed altitudinal bounds. Few voluntarily quit it. There are certain birds that perform seasonal altitudinal migrations, yet all remain in the rain forest.

The howling monkeys bark and scream. These, with the white-headed Capuchins—the organ-grinder's monkey—are the only simian inhabitants of the rain forests. But there are other mammals—sloths, ant-eaters, porcupines and an occasional jaguar.

Insects are the guardians of the ground. Long, black, solid lines of driver ants comb the lower forests in compact masses of ferocious soldiery, searching out every known insect dweller. Cockchafers, grasshoppers, spiders, move in mad flight before the onrushing blind predacious Eciton ants, fully an inch in length, armed with rapacious stings and sickle-shaped mandibles.

The umbrella ants, frugivorous where the Eciton is carnivorous, red where the others are black, also move through rain and sunshine along ant-highways which they have made and over which they carry bits of cut leaves. These are carried below to their catacombs in order to fertilize their fungus gardens. Butterflies are everywhere, lending a chromatic splendor to these rain-soaked jungles. We broke into a mass of drifting yellow and white callidyras and into the encircling bouquets of red and black papillos. They arose like a fountain of flowers and then, like irridescent confetti, drifted down about our shoulders.

But it is the variety and color of birds that gives life to the cloud forest. There is the sad-voiced *timanou,* the piercing dulcet song of the little brown *hilgero* and the "waca-waca" of the laughing Guacohacok. Humming-birds dart in and out among the tree ferns, suspended in mid-air, their wings droning like airplane propellers. *Cotingas,* their white heads looking like unsmirched snow, fill the forest with a single note—"clang-dang"—with all the resonance of clapped bell! But above all these is the apotheosis of the rain forest—the quetzal. (*Continuing on page* 96)

DENIZENS OF THE CLOUD JUNGLES

Center circle — The quetzal, king of the rain forest—a fantastically beautiful and brilliantly colored bird with a supertail thirty-six inches long

The little green-tree frog (begin upper left and read right) furnishes the bleating music of the cloud jungles; next is the Harpy Eagle—enemy of all monkeys, sloths and birds; Tarantulas, the size of a man's hand and prey of the gigantic hunting wasps; the lovely white "Holy Ghost" orchid of the tropics; Brown Tree Boas—harmless to man, dangerous for birds; well-named Butterfly Orchids, with hardy, long-blooming yellow blossoms festoon the higher trees; the Harlequin Beetle, eight inches long, is terrifying to see and, lastly, the Rhinocerous Beetle, with its tremendous mandibles — largest of the Dynastes clan — challenges all comers

DANGER AHEAD

In his war budget message of January 7th, President Roosevelt stressed the need of guarding and conserving our natural resources as a national defence measure. "For example," he declared, "we must maintain fire protection in our forests."

This declaration was timely—more so probably than the President could realize at the time he made it—because a situation has since been rapidly developing which threatens to leave our forests, into which our whole war production effort is integrated, without adequate fire protection during the coming summer. Late in January the situation appeared so ominous from the standpoint of uninterrupted prosecution of the war, that Ovid Butler, Secretary of The American Forestry Association, called it to the attention of members of Congress and urged that action be speeded to meet the danger ahead before it is too late. Mr. Butler's letter follows:

TO MEMBERS OF CONGRESS:

In the interest of guarding resources upon which our war effort is based, this Association feels it would be negligent not to warn the Congress of a situation now developing which imperils supply lines in virtually every field of our military endeavor. Due to the growing shortage of employable labor, the present outlook is that forest resources now being heavily drawn on and which must continue to be heavily drawn on in the prosecution of the war may be without adequate protection from fire during the coming spring and summer fire months.

Specifically the situation is growing out of the fact that the military services and the war industries are draining our forest regions of men normally available for forest protection during the summer months. Added to this shortage is the curtailment and diversion of the Civilian Conservation Corps which heretofore has provided thousands of men to help local and regional forest protection agencies guard the forests and suppress fires when they occur.

The forthcoming extension of the draft and the current expansion of industry make the outlook progressively more acute. In virtually every major forest region where lumber operations have been speeded up to meet the war demands for wood, alarm is being expressed by forest protection agencies as to where and how man power is to be obtained to protect our forest sources of essential war material and to maintain uninterrupted the free flow of wood from the forests to meet current war demands. The supply of local men heretofore available for summer employment in fire protection is not only rapidly disappearing, but under present wage conditions local protection agencies cannot compete with the war industries for those men who may still be available when summer comes.

The situation, we believe, is one of imminent danger, first, because forest fires are the most destructive agency of forest resources and of operations in the forest engaged in supplying forest products vital to the prosecution of the war; second, normal forest fire hazards will be heightened this summer, particularly in the heavily timbered regions of the west, by the possibility of incendiary bombing from the air and by ground sabotage. Third, a combination of bad fire weather and forest incendiarism may readily precipitate a reign of forest fires that would prostrate the industrial life of vital sections on the west coast where war industries are so largely concentrated. We have only to remember, for example, the Tillamook forest fire of 1933 in Oregon which in a few days destroyed timber equal to the total cut of the entire United States; or the Matilja Canyon fire of 1932 in Los Angeles County, California, that swept over 200,000 acres. The list of such examples might be extended.

Public apathy in respect to the importance of guarding our forest resources as a war measure is a corollary danger of the situation. The use of wood in the production of war material and in military action is not dramatic and there is no present shortage of forests for our war needs to alarm the public or to make it fully alert to the forest fire danger. Nevertheless, continuing supplies of forest products are vital to our whole war program affecting such major fields as the building of training planes, cargo and fighting ships, the construction of training camps and cantonments, the shipping of food and equipment to our soldiers and battle fronts, etc. Already the war has called for 2,500,000,000 feet of lumber from our forests and the War Department has just let contracts for upwards of a billion feet more that will be needed in the months immediately

ahead. The military and the war industries will continue to call for wood in these staggering amounts.

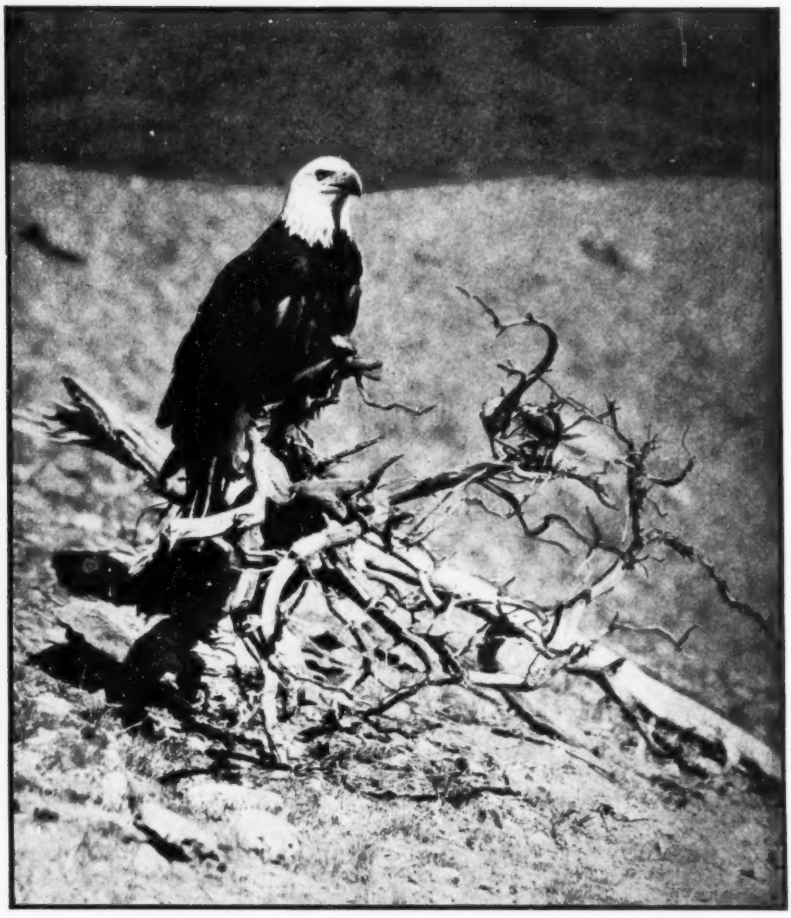
Failure to make provision, therefore, to assure adequate protection of these resources during the seasons of the year when it is known they will be exposed to critical danger may easily disrupt and delay our all-out plans to win this war. Forest fires do not wait for man to organize after the fire season arrives. They can be dealt with sucessfully only by advance organization, planning and preparedness. The question as it now presents itself appears to be primarily one of providing necessary man power in advance through centralized governmental action instead of leaving it to regional protective agencies to compete with one another for labor and to be short-handed and unprepared when critical forest fires break out.

The situation in our judgment is so potentially serious as to warrant forest protection being rated as a war priority. Certainly it challenges the wisdom at this time of permitting continued curtailment of the Civilian Conservation Corps and diversion of its remaining forces to work of less importance than that of guarding resources essential to the maintenance of the war. The present undetermined status of the Corps in the face of the imperative forthcoming need of men in the forest protective field seems unrealistic in relation to the war emergency. The Corps is an established operating organization experienced in patrolling the forests and dealing with forest fires. Its camps are already established and distributed throughout the forest areas. It is in a position to occupy them quickly and to shift its men from one forest region to another as critical fire periods develop. Furthermore, its organization being nation-wide, it can canvass the country from ocean to ocean enlisting young men below the draft age and men rejected by the draft.

These are advantages which local forest protective agencies do not possess. Is it good war strategy to disseminate or liquidate such an organization at probably the most critical time of the war and when the problem of maintaining our supply lines from the forests is pressing and unsolved?

This Association shares the belief that non-defense expenditures of the government should be curtailed, but in view of the situation set forth in this letter it believes that a re-appraisal is very much in order of current demands that the Civilian Conservation Corps be liquidated in the interests of economy and because of its declining enrollments. As regards the economy phase, the issue as respects forest protection now appears to be not a question of saving money but of saving war needed resources at any cost. As to declining enrollment, there are hundreds of thousands of young men below the draft age or rejected by the draft who would like to feel they are helping to win the war, and it is logical to believe that if the CCC were streamlined as a mobile protective unit and given the status of an essential war-work agency, it would easily attract the numbers needed to guard our forests and other natural resources.

Other methods of meeting the situation may be known to you. Taking advantage of the CCC is mentioned because it seems to us a most concrete, promising and economical measure under present emergency conditions. The real purpose of this letter is to call the danger to your attention and to urge that you give it your best effort to see that in the converging pressures from other fields of war, the importance of protecting our forests during the coming fire season is not overlooked but is adequately provided for before it becomes too late to forestall disruption of supply lines so essential to the success of our whole production program.



Dr. Frank R. Oastler

The American Eagle—"the liberty bird that permits no liberties"

MAN

By

THORNTON BURGESS

Because the great bird was of noble and majestic mein, symbolic of liberty, of freedom, of all that is embodied in the full meaning of those words, man made of him a gilded image and placed it on the staff above the flag of his nation. He wrought its likeness in stone to adorn his public buildings, cast it in bronze to crown his monuments, engraved it on the great seal of his United States and on the seals of individual states, stamped it on his coins, printed it on his bills of exchange and documents of state, made it the principal device of the official arms of his Government, and by legislative action proclaimed it the living symbol of all those rights and privileges of which the Stars and Stripes are the emblem.

Then man placed a bounty on the head of the eagle and shot it because the bird took a fish for which man himself had no need.

Man entered into and took possession of a vast and rich inheritance of fertile lands and great forests and mighty rivers fed by innumerable smaller streams. He robbed the soil of its fertility, laid waste the great forests, exploited to his own immediate selfish ends the rivers and streams, and when fire and flood threatened his ruin he cursed the power of natural forces he himself had let loose. Having wrought destruction he began to prate of conservation.

For the paltry value of its skin he trapped the first true conservationist, the beaver, whose dams through the ages impounded the waters of smaller streams and kept under control in large measure the mighty rivers, and whose ponds had, by gathering on their bottoms vast stores of decaying vegetation, produced, when drained, the richest and most fertile of all lands.

Great is Man!

EDITORIAL

CONSERVATION EDUCATION

FOR YEARS conservationists have been telling one another that conservation is largely a problem of education. Believing it, they have spent many words and large sums in the name of conservation education. Now, some of them are finding that before the problem of conservation can be solved by education, they must first solve the problem of education.

I do not pretend to be wise enough to draw up a blueprint of conservation education that will be good any place, whether in the Everglades of Florida, a coal mining town in Pennsylvania, a tenant farm in southeast Missouri, or a Cape Cod fishing hamlet. It is possible, however, to make a few simple statements that can be understood by all interested in this subject.

Conservation education must start where you are and not in some far off Sahara. It must deal with what you have and not something over in the next county. It begins in the home when you turn on the light or water, when you heat the house, and when you butter the bread. It concerns not just Johnny in the elementary grades, but the whole family including grandparents and relatives. It means intelligent and cooperative application to good living and to habits of good workmanship.

Conservation education is fundamentally a "doing" or experience program. It means putting up a cornstalk tepee shelter with ears of corn for winter feeding, or raising evergreen seedlings to cover waste land, or helping a game official to stock a stream. It means right use of our natural resources and not merely saving them.

Conservation is not "parroting a textbook." Textbook writers on conservation do not always act democratically. They dictate and you cooperate. Their textbook is like a hat. You put it on like a hat—no matter whether it fits or not. You may have to pull it down over your ears. This does not mean that I would not have a good reference library in case I wanted to know how to raise pheasants. If it were a school library I would rather have thirty good reference books than thirty textbooks all of the same kind.

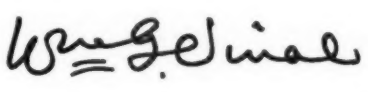
Conservation education must be scientific—facts and not propaganda. It must be in such simple terms that it can be conveyed to the intelligent non-scientist. For example: Building a window feeding station, putting out suet and a variety of seeds, taking notes on what each kind of bird eats and writing conclusions. I once saw a frieze made up of footprints, each camper contributing an ink print of his foot. Conclusions about deformed feet caused by shoes that were too small were quite evident. This procedure means finding the significance of facts and the testing of conclusions rather than mere memorizing in a course of study. "Lesson-hearing" plans will not get to first base in progressive schools. Right attitudes and appreciation are as necessary as exact knowledge.

Conservation education means enriching the outdoor lives of children rather than the adding of a new course to the closeted curriculum. It is something that must be lived and practiced cooperatively in the community. It is something like the present day defense program where every citizen, no matter what his age, appreciates the feelings, thoughts, and actions of others, and all cooperate toward a common goal. Conservation is an all-time defense program.

The weakest link in conservation education is the lack of trained leaders. They have no imagination. Their creative ability approaches nil. If their training has been limited to such things as dissecting earthworms, pickled biology is about as much as they will have to offer. Pagan Japan has been furnishing the United States with three million dollars' worth of Easter-lily bulbs annually. That's not a difficult one to let your imagination play upon.

Conservation education is bigger than any one sportsman, or farmer, or naturalist, or school teacher, or politician, or editor, or technician. It must be a cooperative program, which enlists the best of combined brains and experience in the community.

The best conservation program I ever saw never mentioned the word conservation. Life Camps, Inc., consists of one girls' camp and two boys' camps for underprivileged children of New York City. They live in the woods in groups of six or eight with two leaders. They make their own stoves, gather firewood, do their own cooking, make their own trails, build shelters, feed the wild birds, put out salt licks for the deer, and protect the woodland flowers. They make soap by using wood ashes. They repair their own shoes. They have a portable fire extinguisher—shovels and rakes near the stone built oven. Conservation to them is not conversation. They do it.



YOUR SHADE TREES:

By P. P. PIRONE

CHANGING GRADES AROUND TREES

LAST summer I was asked to diagnose the cause of the gradual weakening of a large number, and the death of a few, beautiful old oaks and American beeches in a new property development in northern New Jersey.

The outward symptoms were small yellow leaves, numerous suckers along the main trunk and branches, many dead twigs, and even large dead branches. Such symptoms are not peculiar to trees in new real estate developments. They occur commonly along new highways, or where lawns and terraces are graded. I questioned the owners, many of whom had bought the homes primarily because of the large trees in the vicinity, as to what precautions had been taken to minimize the shock of placing the roots of these long-established trees in a new environment. The usual answer was "none was thought necessary," or "we don't know." As far as is known the building contractor dug the subsoil from the cellar location and spread it around nearby trees. I had no trouble explaining what was wrong. I directed the owners' attention to what was being done at that moment on another property up the road in the same development. Here bulldozers and trucks were busily engaged in removing the soil from the cellar location and placing it in six and eight-foot piles around beautiful old trees. Here also was a five-foot trench dug along a beautiful white oak, with all roots on that side of the tree cut away completely. The illustrations give a much clearer picture than do words.

Severe injury will probably result from raising the original soil level, as seen around the base of the trees at the right

Why Trees Suffer from Fills

The addition of soil around large trees may seriously disturb the delicate relationship between roots and soil and may result in considerable damage or death to the tree. What actually happens when a blanket of soil is placed over the root area?

Air, primarily oxygen, and water are essential for normal functioning of roots, which, consequently, become established within a certain area in the soil where these necessary materials are present. Soil microorganisms, necessary to break down organic matter that serves as food for the roots, also need air. When air is lacking, certain gases and chemicals increase and become toxic to roots.

The moment a blanket of soil is placed over the long-existing soil level, a marked disturbance occurs in the balance between the roots and these essential materials. Other detrimental factors occur during the construction of new homes. Numerous trips by bulldozers, trucks, and other heavy equipment over the root area tend to compact the soil and disrupt the delicate root-soil relationship. Digging numerous cellars to depths of six, eight, or ten feet is bound to cause change in the water level to which trees have become accustomed during the previous fifty or 100 years.

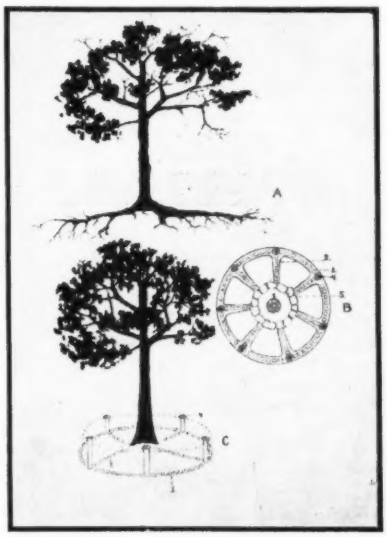
As a result, many roots die, and the symptoms soon become visible in the above-ground parts. These symptoms may appear within a month, or they may not appear for several years.

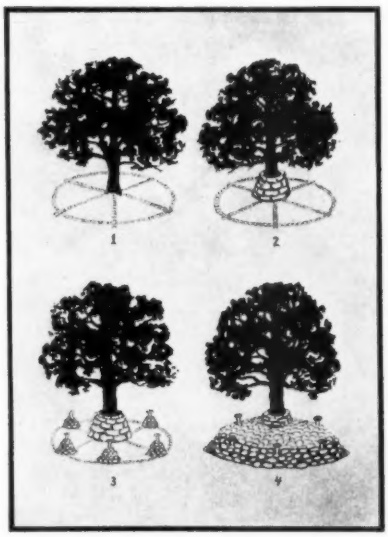
The extent of injury from fills varies

Here, in laying a sewer pipe, the roots of a fine white oak were drastically cut away

with the species, age, and condition of the tree; the depth and type of fill; drainage; and several other minor factors. Beech, oak, sugar maple, and evergreens are most seriously injured; birch and hickory suffer less; and elm, locust, plane, poplar, and willow are least affected. Trees in weak vegetative condition, at the time the fill is made or the nearby house is constructed, are naturally more severely injured than vigorous trees.

The deeper the fill, the more marked is the disturbance to the root. Clay soil fills cause most injury, because the fineness of the soil particles results in shutting out the air and water almost completely. Such soils are compacted firmly by heavy machinery used during construction. The application of only an inch or two of clay soil may cause severe injury. Gravelly fills cause least trouble because both air and water permeate them readily. As a rule, the application of a layer several inches deep of gravelly soil, or even of the same kind of soil in which the tree has been growing, will do no harm. In such cases, trees eventually become accustomed to the new situation by producing additional roots near the surface.





The steps in reducing injury in existing fills, described in the text, are shown above; and, to the right, are shown methods of preventing injury where it is necessary to make soil fills

Saving Trees in Existing Fills

The home owner whose trees have been improperly treated is naturally interested in ways of alleviating or eliminating the harmful effects. Unfortunately, little can be done to save the trees that have been subjected to grade fills over a long period. But much can be done to restore trees surrounded by recent fills, or trees that do not yet appear to have suffered seriously from older fills. Corrective treatments, which should be undertaken as quickly as possible, must have as their objective the duplication, so far as possible, of conditions existing before the fill was made.

The following are the most commonly accepted methods:

Where a relatively shallow layer of soil has been added, the soil is periodically broken up or cultivated, compressed air is forced into it, and fertilizers and water are added.

Where the fill is moderately deep, the soil directly around the trunk is removed to the original level and a dry well is constructed. Holes are dug to the original level every few feet over the entire root area, and six-inch bell tiles are placed upright in them. Fertilizers are then placed in the soil as near the root zone as possible.

Where the fill is deep or where a particularly valuable tree is involved, more work and expense are required. The cuts on this page demonstrate the procedure to be followed. Figure A shows a tree whose roots are considerably below the proper level because of the grade fill. Figure B shows a bird's-eye view of the plan of procedure. The soil (1) close around the trunk is removed to the original level. Trenches (2) radiating from this area to points below the outer spread of the branches are dug. The level of the radial trenches should slope downward from the trunk to the outside in order to drain water away from the trunk. The ends of the radial trenches are connected by a circular trench dug to the same level. Hydrated lime and fertilizer are added in the exposed area in the radial and circular trenches, but *not* around the trunk. A well of loosely joined stones (5) is then built around the trunk, and lines of 4-inch agricultural tile (3) are placed in the radial and circular trenches. The tiles should be joined tightly enough to hold out soil, but loosely enough to allow air and water to enter. The joints are covered with cardboard or old tin to prevent clogging by soil. Six-inch bell tiles (4) are placed upright over the junction of the tiles in the circle and radii, and stones are piled around to hold them in position. Rocks, followed by crushed stone and gravel, are then placed over the ground tile, and the remaining space (about 12 inches) is filled with good topsoil. Figure 1C shows a view of the last stages in this procedure. It does not show the dry stone well around the trunk or the rocks piled around the upright bell tiles.

Preventing Injury from Soil Fills

Although the initial cost of proper precautionary measures is high, prevention of injury is much more effective than the curative measures just described.

The ground around the base and underneath the branch spread is cleared of all plants and sod. Commercial fertilizers are then inserted into the soil according to the standard practice. The procedure from this point is sketched in the next illustration. Four-inch agricultural tile is laid in a wheel-and-spoke design with the tree as the hub (1). The radial lines of tile near the tree should be at least a foot higher than the ends joining the circle of tile. A few radial tiles should extend beyond the circle and should slope sharply downward to insure good drainage. An open-jointed stone or brick well (2) is then constructed around the trunk up to the level of the new fill. Six-inch bell tiles are placed above the junctions of the two tile systems, the bell end reaching the planned grade level, and stones are placed around the bell tiles to hold them erect (3). All ground tiles are then covered with small rocks and cobblestones to a depth of eighteen inches. The large rocks are then covered with a layer of crushed stone (4) and these in turn with gravel, to a level of about twelve inches from the final grade. A thin layer of straw or hay should be placed over the gravel to prevent soil from sealing the air spaces. Then good topsoil should be spread over the entire area except in the tree well and in the bell tiles, and to prevent clogging, crushed stone should be placed over the openings of the radial tiles inside the dry well.

GUAYULE—THE VICTORY RUBBER

(*Continued from page* 73)

the best location found in the United States for cultivating guayule, is not immediately known. But according to Loren G. Polhamus, senior agronomist for the United States Department of Agriculture, and one of the nation's outstanding authorities on rubber, guayule can be successfully cultivated throughout the semi-arid region from Texas to California and in north central Mexico. The limit of its northern range is determined by winter temperatures, for it is believed that guayule will not thrive where temperatures below fifteen degrees Fahrenheit are common.

In the Salinas Valley winter rainfall is sufficient for the field plants without irrigation, and the long dry summers are favorable for growth and essential for the formation of rubber. Irrigation probably will be necessary, however, in many southwest locations and this will add materially to the cost of production. But in a war crisis such as the country is now facing costs become of secondary importance. It is conceivable therefore that from 500,000 to 1,000,000 acres of cultivated guayule will be available to help fight the battle of rubber. It is conceivable also that this acreage, in four or five years, can produce from 300,000 to 400,000 tons of crude rubber, enough to meet military requirements, as now visualized, for twelve months. Should such a crop be harvested in two or three years, approximately 100,000 tons of rubber, or four months' military supply, would result.

Obviously, planting and cultivating from 500,000 to 1,000,000 acres of guayule in a reasonably short time—and time is the most important factor now—is a task of great magnitude. But experts believe it possible. The initial Salinas Valley project as now visualized must be considered mainly in the light of experimentation and preparation for a vastly larger undertaking. Nurseries would be greatly expanded, additional seed collected, as large a field area planted as possible, and new areas for cultivation thoroughly explored. This would require from eight to twelve months. If at that time the road to Singapore is still under the domination of Japan, it is entirely possible a guayule rubber project of undreamed-of proportions will be vigorously pursued.

Just what is this rubber-bearing desert shrub which overnight has become so important in the nation's fight for existence? To begin with, and in its wild state in Mexico and southern Texas, guayule appears much like sagebrush, seldom exceeding a height of eighteen inches. The cultivated plant, as developed through years of experimentation in California, is considerably larger, reaching twenty-four or more inches in height. The rubber content of the wild plant is generally around ten per cent, that of the cultivated plant twenty per cent or more.

No one knows just when rubber was first extracted from guayule, though it appears certain that for untold years natives of Mexico have been fully aware of its qualities as a rubber producer. There is some belief that the Aztecs utilized the plant for its rubber content. However that may be, it is definitely known that prior to 1900 shipments of the wild shrub were made to Germany for extraction experiments, and at the beginning of the century local industrial utilization of the shrub was started in Mexico and small scale production has been continuous since then. At the present, Mexico is producing commercially from 1,000 to 4,000 tons of crude guayule rubber a year, though by conservative use of its wild stock a constant annual production of 7,000 tons is possible.

Quoting rubber expert Polhamus, "Cultivation experiments were initiated in California about thirty years ago and as a result strains of guayule with a rubber content of more than twice the average of wild plants were developed. Strains also were selected on the basis of size and growth vigor, and a constantly increasing yield of rubber from cultivated selections was obtained. This increase was paralleled by advances in methods of cultivation, the development of special machinery for handling nurseries, special machinery for planting, cultivating, and harvesting, improved processes for extracting the rubber, and special uses for the rubber in its industrial application."

As developed in Salinas Valley, the cultivation of guayule is a "moving-belt," highly developed agricultural process, he declared. "Pre-sprouted seed are planted thickly on nursery beds and covered with a thin layer of sand. After eight to twelve months seeds are gathered from the young seedlings by a vacuum device, after which the plants are cut back by a special cutter. Then the whole nursery bed is uprooted by a tractor-drawn bar which cuts off the roots about eight inches below the surface. The plants are then transplanted in the field, a planter which permits planting six rows at a time being used. At harvest guayule is plowed up, windrowed, gathered and shredded by special equipment in the field."

Rubber is obtained from guayule by a mechanical process. According to Mr. Polhamus, this process consists of "cutting the shrub into small pieces and subjecting it to the action of a pebble mill. The woody portions of the plant are disintegrated by flint pebbles while the rubber particles agglomerate to form small masses called 'worms.' Means are then used to water-log the disintegrated woody material so that it will sink in water. The rubber worms, lighter than water, can be separated by flotation. Rubber obtained by this process contains from sixteen to twenty per cent resins, but these can be removed by a simple treatment with acetone or other resin solvent. The rubber

(*Continuing on page* 92)

Paul G. Redington

DEATH CLAIMS PAUL G. REDINGTON

Paul G. Redington, nationally known forester and conservationist, died in Virginia on January 12. He was sixty-four years old. Prior to his retirement in 1938, he had served in the Department of Agriculture for thirty-four years, twenty-seven with the Forest Service and seven as chief of the old Biological Survey.

Graduating from Yale Forest School in 1904, Mr. Redington entered the Forest Service in the early days of that organization and spent twenty years in national forest work in the West, first as inspector and later as supervisor of a number of forests. Following 1918 he served as regional forester of the Southwestern and California Regions of the Forest Service and in 1926 was called to Washington to direct the Service's public relations work. In 1927, he was named chief of the Biological Survey, in which capacity he served until 1934 when he resigned to resume his chosen work with the Forest Service.

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CONSERVATION IN CONGRESS

WHILE the President's $56,000,000,000 "Victory Budget" for the 1943 fiscal year, sent to Congress January 7, contains substantial decreases for conservation activities as compared with the current year, the "war" against destructive agencies of the forest will be fought with greater vigor. In the spirit of the editorial appearing in the Editor's Log in the January issue of AMERICAN FORESTS, practically all estimates for items providing for control of forest fires, tree insects and diseases are increased or maintained in status quo. Commenting on such items the President said: "In a true sense, there are no longer non-defense expenditures. It is a part of our war effort to maintain civilian services which are essential to the basic needs of human life. In the same way it is necessary in wartime to conserve our natural resources and keep in repair our national plant. We cannot afford waste or destruction, for we must continue to think of the good of future generations of Americans. For example, we must maintain fire protection in our forests; and we must maintain control over destructive floods. In the preparation of the present Budget expenditures not directly related to the war have been reduced to a minimum or reoriented to the war program."

All conservation activities in the 1943 budget, if approved by Congress, will cost just over one-half billion dollars as compared with nearly one billion dollars in the 1942 fiscal year. However, the major portion of this decrease is accounted for in the $50,000,000 decrease in benefit payments to farmers for soil conservation practices, to total $450,000,000, and failure to estimate expenses for operation of the Civilian Conservation Corps, which received $246,960,000 in the current fiscal year. Commenting on his omission of funds for the Civilian Conservation Corps and the National Youth Administration, the President said: "Under war conditions there is need and opportunity for youth to serve in many ways. It is therefore possible to make a considerable reduction in the programs of the Civilian Conservation Corps and the National Youth Administration. The youth, too, will be aided by the United States Employment Service in finding employment opportunities. Although I am estimating $100,000,000 for these two agencies, excluding $50,000,000 for defense training, it is probable that the total amount will not be needed. I am postponing until next spring presentation to the Congress of specific recommendations as to youth aid."

The estimate for white pine blister rust control work during 1943 is $1,974,000, an increase over the current fiscal year of $682,440. Of this amount the Forest Service is allocated $1,044,000; the Bureau of Entomology and Plant Quarantine $755,000, and the Department of the Interior $175,000. This amount should enable these agencies to check the spread of blister rust to great areas of Idaho white and sugar pine in the West and white pine in the East. However, increased labor costs and inability to get desirable labor may tend to nullify this increase.

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CONSERVATION IN THE 1943 BUDGET

Appropriation and Project	1943 Budget Estimate	1942* Appropriation
Department of Agriculture		
Forest Service	$17,300,565	$20,025,830
General Administrative Expenses	579,000	605,030
National Forest Protection and Management	11,283,095	11,179,457
Fighting Forest Fires	100,000	100,000
Private Forestry Cooperation	114,000	100,928
Research—Forest Management	566,500	611,712
Range Investigations	255,500	273,103
Forest Products	1,016,260	966,313
Forest Survey	250,000	252,629
Forest Economics	133,000	141,490
Forest Influences	129,000	136,820
Forest Fire Cooperation	2,500,000	2,425,000
Emergency Forest Fire Control		1,100,000
Acquisition of Lands for National Forests	354,210	1,797,348
Acquisition of Lands from Receipt Funds		316,000
Soil Conservation Service	22,507,204	25,602,109
Miscellaneous—Department of Agriculture		
Cooperative Farm Forestry, Total	700,000	700,000
Includes:		
Extension Service	107,000	107,000
Forest Service	163,982	461,982
Soil Conservation Service	427,018	129,018
Dutch Elm Disease Eradication	456,475	353,345
White Pine Blister Rust Control, Total	1,974,000	1,291,560
Includes:		
Bureau of Entomology and Plant Quarantine	755,000	490,892
Forest Service	1,044,000	685,668
Department of the Interior	175,000	115,000
Gypsy and Brown-Tail Moth Control	457,570	378,410
Forest Insects—Studies and Control	205,180	214,665
Diseases of Forest Trees	243,460	256,835
National Arboretum	54,892	54,662
Naval Stores Investigations	118,456	116,605
Department of the Interior		
Fish and Wildlife Service	7,871,775	9,583,915
National Park Service	4,853,655	5,263,775
Grazing Service	921,125	1,125,000
Soil Conservation—Public Lands	1,500,000	2,178,700
O. and C. Lands	200,275	200,000
Prevention of Fires in Alaska	27,750	27,300
Indian Forests:		
General Administration	393,320	389,710
Sale of Timber	127,770	118,790
Suppression of Forest Fires	15,000	95,000
General Public Works		
Roads and Trails—Forest Service	6,500,000	9,990,165
Roads and Trails—National Park Service	200,000	3,000,000
Blue Ridge Natchez Trace and George Washington Memorial Parkways	300,000	6,000,000
Civilian Conservation Corps		246,960,000
Tennessee Valley Authority (Forestry, Wildlife, Recreational Development)	728,539	653,224

*Including deficiency and supplemental appropriations.

protection of the native American elm against the ravages of the Dutch elm disease, the 1943 budget increases the current year's expenditure by thirty per cent to a total of $456,475. The item for gypsy and brown-tail moth control is estimated at $457,570, an increase of $79,160 over the current year. The full $2,500,000 authorization for cooperative forest fire prevention under the Clarke-McNary Act is provided, an increase of $75,000 over funds available in the 1942 fiscal year.

As against these increases in destructive agency control items, the 1943 budget decreases forest insect studies and control by $9,485 to a total of $205,180, and diseases of forest trees $13,375, to a total of $243,460.

Decreases for specialized conservation agencies as represented by the Forest, Soil Conservation, Park, Wildlife and Indian Services, totaled $21,000,000. The Forest Service estimate, including forest roads and trails, was decreased over $6,000,000 to a total of nearly $24,000,000. Most substantial cuts are: national forest acquisition, decreased $1,760,000 to a total of $354,210; forest roads and trails, decreased $3,490,000 to a total of $6,500,000; forest management research, decreased $45,212 to a total of $566,500; and general administrative expenses, reduced $26,030 to $579,000. While the forest survey item was reduced $2,629 to a total of $250,000, the 1943 budget estimate for forest products research as conducted at the Forest Products Laboratory was increased $49,947 to a total of $1,016,260. Although no provision was made in the budget for emergency forest fire control, for which $1,100,000 is available in the 1942 fiscal year, such an item is expected in a deficiency bill later this session.

While the total budget estimate for the Soil Conservation Service was decreased twelve per cent to a total of $22,507,204, forest conservation and wildlife activities in the Department of the Interior received net decreases of more than forty per cent. Expenses for operation of the National Park Service were estimated at $4,853,655, a decrease of $410,120 from the current fiscal year. The item for construction and maintenance of National Park Service forest roads and trails was decreased $2,800,000 to a total of $200,000, and the estimate for construction of Blue Ridge, Natchez Trace and George Washington Memorial Parkways was cut $5,700,000 to a total of $300,000.

The Fish and Wildlife Service was decreased $1,712,140 from last fiscal year to a total of $7,871,775, and the Grazing Service was cut $203,875, to a total of $921,125. While the estimate for soil conservation activities on public lands was reduced $678,700 to a total of $1,500,000, items for protection and management of the Oregon and California grant lands,

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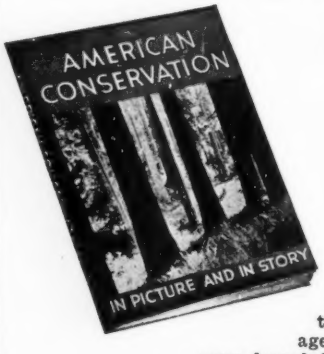

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prevention of forest fires in Alaska, and general administration and timber sales on Indian forests received slight increases.

The second session of the 77th Congress, which convened January 5, 1942, is merely a continuation of the first session, which ended December 31, 1941. All bills introduced in the first session maintain their status until December 31, 1942, the close of the 77th Congress.

To make available a future domestic source of crude rubber, Senator Downey of California introduced S. 2152 on December 22, providing for the planting of 45,000 acres of guayule, a rubber producing plant.

Containing an $80,000 item for fire suppression on Indian Reservations; $17,800,000 for flood control; and $2,700,000 for maintenance of existing river and harbor works, H. R. 6159 was approved December 17, and is now public law No. 353.

Agreed to December 18, Senate Resolution 199 authorizes the Special Committee on Wildlife Resources to expend an additional $7,000 from the contingent fund of the Senate for its investigation.

Senator Wall Doxey of Mississippi, has been appointed to the Senate Committee on Appropriations, along with Senator James M. Mead of New York, and Senator Burnet R. Maybank of South Carolina. No announcement has been made concerning the assignment of these new members to the several subcommittees.

Establishment of a temporary Weeks Law purchase unit for Nerstrand Woods, near St. Paul, Minnesota, was approved by the National Forest Reservation Commission on December 9. The Minnesota State Land Board desires to acquire approximately 800 acres of mixed hardwood forest in Rice County for a State Forest. Known as the "Big Woods" the area is broken into more than one hundred ownerships. While the State lacks funds to acquire this property it owns large acreages in the Superior and Chippewa National Forests. Accordingly an arrangement has been made whereby the federal government will acquire the Nerstrand unit and later exchange this land for State-owned lands in the national forests. This system has worked out well in Michigan where acquisition of the Tahquamenon Falls Area in the upper peninsula for park purposes was made possible by a similar arrangement.

Uncle Sam's Forest Rangers

"Uncle Sam's Forest Rangers," one of radio's oldest dramatized educational programs, rounded out its first decade with its tenth anniversary program January 2. This broadcast, occupying its regular position on NBC's Farm and Home Hour, featured the dramatization of significant events in forest conservation which have taken place since 1932, when the "Forest Rangers" first went on the air.

CONSERVATION CALENDAR

Important Bills in Congress with Action December 12, 1941, to January 15, 1942

CONSERVATION

S. 2152—DOWNEY—To provide for the planting of guayule and other rubber-bearing plants in order to make available a domestic source of crude rubber for emergency and defense uses. Introduced December 22, 1941. Reported by the Senate Committee on Military Affairs, with amendments (Report No. 924), December 23, 1941. Recommitted to the Committee on Military Affairs January 5, 1942. Reported with amendments, January 7, 1942. Amended and passed by the Senate January 15, 1942.

H. R. 6299—ANDERSON—To provide for the planting of 75,000 acres of guayule in order to make available a domestic source of crude rubber for emergency and defense uses. Introduced January 5, 1942. Referred to the Committee on Agriculture.

GOVERNMENTAL FUNCTIONS

S. Res. 199—Authorizing the Special Committee on Conservation of Wildlife Resources to expend $7,000 from the contingent fund of the Senate, in addition to the amounts heretofore authorized, in furtherance of investigations relative to the conservation of wild animal life. Resolution agreed to December 18, 1941.

LANDS

H. R. 4465—ANDRESEN—Authorizing the exchange of lands within Minnesota to permit the constructive consolidation or disposal of 238,188 acres of public domain lands in that state. Passed House December 15, 1941.

PUBLIC DOMAIN

S. 2127—JOHNSON, California—Amending Section 6 of the Act entitled "An Act granting to the city and county of San Francisco certain rights-of-way in, over, and through certain public lands, the Yosemite National Park, the Stanislaus National Forest, and the public lands in the State of California, approved December 19, 1913." Introduced December 15, 1941. Referred to the Senate Committee on Public Lands and Surveys.

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Prevention of Soil Erosion

Preservation of Wilderness for Recreation

Establishment of State and National Forests and Parks

Development of Forestry Practices by the forest industries.

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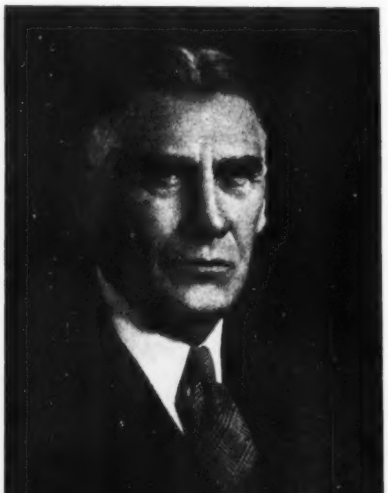
DEAN OF STATE FORESTERS TO RETIRE

FRED WILSON BESLEY of Maryland, dean of state foresters, and for eighteen years a director of The American Forestry Association, will retire on March 1. Thirty-six years ago, he was elected by the newly created Maryland Board of Forestry to head up its work and he has since served as state forester—a record for the longest continuous service of any state forester in the United States. His career, however, began in 1901 with the old Bureau of Forestry of the United States Department of Agriculture. Thus, in March, he will round out forty-one years of devoted and fruitful work in forest conservation.

Born in Vienna, Virginia, February 16, 1872, Mr. Besley was graduated from the Maryland Agricultural College in 1892. Engaging in forest work for the government, he made early reconnaissance and growth studies in Michigan, Kentucky, New York, Texas, and Colorado. In 1904, after taking his master's degree in forestry from Yale, he returned to the Forest Service to conduct nursery and planting operations in Nebraska and Colorado.

Coming to Maryland in 1906, when the State Board of Forestry was created by the Maryland Legislature, Mr. Besley set to work with one full-time employee and an appropriation of $3,500. Today, a great tribute to his foresight and skill in management and administration, there are 118,000 acres of land in state forests and parks. The annual forestry budget is now $59,988, and the Maryland State Department of Forests and Parks has seventy full-time employees. His fire organization has grown from fifty-seven wardens to more than 750; thirty-four fire observation towers are now in operation, some of them equipped with radio.

When Mr. Besley first took office, he realized that the mapping of forest areas was a vital necessity. To assist in this work, he rigged a cyclometer to the wheels of his buggy, and in this way measured many of the forest areas in the state. He also early recognized the need of working closely with farmers who, in Maryland, owned sixty per cent of all woodlands. This he did through long and tedious hours, but from his efforts was developed the Maryland Plan of Woodland Management, which is still in use. Under this program, farmers of the state are furnished detailed reports on their woodlands, with plans for their proper management and protection.



FRED WILSON BESLEY

As state forester, Mr. Besley has conducted a farm forestry course at the University of Maryland; he started a state forest nursery from which more than 400,000 seedlings for forest plantings are distributed each year. He brought about the Roadside Tree Law in 1914 which has saved thousands of roadside trees from destruction; he also brought about the Railway Safety Strip Law, which has protected large areas of forest lands from fire.

Among the elective offices he has held are: Director, The American Forestry Association; secretary, The Maryland Forestry Association; member of the Executive Council and treasurer, Society of American Foresters; president, Yale Forest School Alumni Association; president, Association of State Foresters. At present he is director of the Department of State Forests and Parks; member of the Research Council, Allegheny Forest Experiment Station; member of the Maryland Board of Natural Resources and member of the National Defense Communications Board.

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WAR THREATENS LOSS OF MILLIONS OF YOUNG TREES

BECAUSE of the war, millions of little trees growing in forest nurseries throughout the country may have to be abandoned or plowed under. This is the situation that is facing federal and state agencies which have established forest nurseries for the growing of trees with which to reforest denuded lands. The number of such nurseries maintained by federal and state conservation agencies approximate 200 and the planting stock now growing in these nurseries is estimated to exceed 600,000,000 trees.

The principal reason why great numbers of these trees may have to be scrapped is loss of CCC labor. Heretofore the Civilian Conservation Corps has employed thousands of its enrollees in the planting of nursery stock grown by the federal and state conservation agencies. Due to the shrinkage of the Corps and the uncertainty as to its continuance, however, these agencies are now without adequate funds or labor with which to plant the stock grown. Based on an average cost of production of $3 to $4 a thousand, the trees now in the nurseries represent a cost value of upwards of $2,000,000.

Just what amount may have to be abandoned is not now known. Plans are underway to distribute as much of the surplus as possible through the state forestry and conservation commissions. These state departments are in a favorable position to dispose of young trees for reforestation to individuals and private agencies in their states, and it is hoped that through them the amount of stock that may have to be abandoned can be kept to a minimum.

Unless the outlook changes radically within the next few months, however, it seems certain that some of the nurseries will have to be abandoned completely and others very greatly reduced in productive capacity. Trees grown in forest nurseries for field planting, it is pointed out, have to be moved from the nursery when of proper planting size or it becomes impracticable to handle them.

FORESTERS ELECT NEW OFFICERS

DR. HENRY SCHMITZ, chief of the Division of Forestry, University of Minnesota, has been elected president of the Society of American Foresters. He has been editor-in-chief of the *Journal of Forestry*, monthly magazine of the Society, since 1937. He succeeds Dr. Clarence F. Korstian, dean of the School of Forestry, Duke University.

Professor Shirley W. Allen of the School of Forestry and Conservation, University of Michigan, was elected vice-president. Formerly forester for The American Forestry Association, he succeeds Edward I. Kotok, United States Forest Service.

Five former members of the Council were re-elected for two-year terms: I. F. Eldredge of New Orleans, in charge of the Forest Survey in the South; Harry T. Gisborne of Missoula, Montana, U. S. Forest Service; Ralph C. Hawley of Connecticut, Yale School of Forestry, Yale University; William C. Howard, State Forester of New York; and Allen S. Peck of Denver, regional forester, United States Forest Service.

New Council members elected for two-year terms are: Edward C. Behre of Connecticut, director of the Northeastern Forest Experiment Station; Frederick S. Baker, Department of Forestry, University of California; F. P. Keen of Portland, Oregon, Bureau of Entomology and Plant Quarantine, United States Department of Agriculture; and H. A. Smith of Guntersville, Alabama, Department of Forestry, Tennessee Valley Authority.

The Society of American Foresters has national headquarters in Washington, D. C., and is made up of nearly 5,000 professionally educated foresters.

Selected Reading References on Conservation

A COMPREHENSIVE list of reading references forms an appendix to the book — AMERICAN CONSERVATION — In Picture and In Story.

This list has been reprinted as a separate of twelve pages, to meet the many calls for reference material. Copies may be obtained for 10c in coin or stamps.

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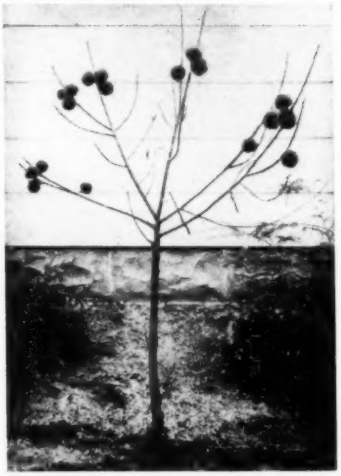

The tree here pictured is 4 feet high, with 18 burrs, each containing three nuts. Chestnuts begin to bear when young.

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WOMEN AS FOREST BUILDERS

(*Continued from page* 65)

Next in size on the Golden Jubilee list came Pennsylvania with its 300 acres in the Allegheny National Forest and in the State D.A.R. Forest at Warren; and Michigan with 280 acres in the Fife Lake State Forest. Virginia had already planted a Constitution Forest of sixty acres in the George Washington National Forest.

Somewhat in the vanguard, too, Ohio D.A.R. Chapters with Mrs. Lester A. Lusher as conservation chairman, in October, 1940, dedicated 111,000 pines in a distressed area in the Wayne National Forest. Lifting conservation to a lighter but no less sincere atmosphere, Buckeye Chapters climbed high in the organization of the Ohio Squirrel Club, of which Mrs. Frank R. Crow is president.

In 1935, Missouri broke some of its tradition of being shown. Under the leadership of Mrs. K. C. Weber, moving spirit in the founding of five other cooperative forests in as many organizations, the Sarah Barton Murphy Chapter deposited a fund to establish a memorial forest as soon as the government could read its title clear to a certain tract of land in the denuded Ozarks, then coming into the federal forest family. Among this flock of "penny pine" forests is one funded entirely by coppers from 10,000 school children in St. Francois County.

This green network now reaches from the ridges of New England into the Smokies and the deep South; through wretched lands along the Ohio River watershed; into the Ozarks of Arkansas, Missouri and Illinois; throughout the Midlands where shelterbelts are greening the nation's granary; over the Continental Divide in the tops of the Rockies; into the redwood region of California; and along the International Boundary line in Minnesota, Wisconsin and Michigan.

"In planting several million Penny Pines on United States forest land during the last three years," editorializes the *National Historical Magazine,* "the National Society has set in operation forces which will be of lasting national benefit. . . . The small contributions toward these forests will return in uncounted dividends. The Society will not be contented to stop with these plantings. Millions of acres privately owned must be rescued. . . . The Penny Pines Project of the Golden Jubilee will reach its fullest development only if our members and chapters encourage owners to extend scientific methods of reforestation."

All of which adds up to the fact that womankind, equipped with on-the-spot knowledge, not only look up from the ruck to the stars, but they are familiar with aims and ideals in a he-man's realm.

In certain regions "selective logging" and "sustained yield" are becoming household slogans. A few of the hardier variety venture into cutting areas to see what certain individualism does to "green gold" reserves in contrast to common sense cutting. A far cry from the time when women were considered conservationists when they planted a few petunias around a mailbox.

The technical foundation of forestry has been laid in the United States. Surely mothers around the firesides and teachers at their desks can help a clipper-speeded nation to become more faithful forest guardians. Women's spiritual insight is needed to turn a bad present into a better future.

GUAYULE—THE VICTORY RUBBER

(*Continued from page* 84)

thus obtained can be used for most purposes for which Para rubber is used."

In spite of these improvements, he declared, rubber cannot be produced from cultivated guayule at a cost competitive with the price for which Para rubber from the tropics could, before the war, be put on the New York market. "The best estimate which the Department of Agriculture is able to obtain indicates that if the plants are left in the field for a period of four years before harvest the cost of production would be about twenty cents a pound for commercial quality rubber containing approximately sixteen per cent resins. Deresination, for the purpose of making the rubber directly comparable with Para rubber, might cost as much as five cents a pound additional."

If the plants are left in the field until they reach the period of economic maturity, that is, the greatest return in relation to total costs of production, at least three years more would be needed and the cost of the rubber would be appreciably less but still substantially higher than comparable costs of Para rubber, he pointed out.

Several thousand acres of guayule have been planted experimentally in the Salinas Valley, some of it on land owned by the Intercontinental Rubber Company, some of it on leased land, and some by contract with individual farmers. "When it became apparent," said Mr. Polhamus, "that commercial extension of the plantings could not be made on a sound business basis, the company used the planted shrub for producing rubber without replanting. At that time farmers having contracts with the company received payments which actually represented an excellent return on their land for the period involved."

Nevertheless, said Mr. Polhamus, guayule rubber offers a definite measure of insurance of continued rubber supplies in the United States during the present emergency. "For long-term supplies, however, and at costs which are competitive with those for rubber produced anywhere in the world, the Department of Agriculture believes that the development of Hevea rubber culture in tropical America is the answer."

The report of the Senate Committee on Military Affairs is not so cautiously worded. It states: "It is the opinion of the Committee that if the Department of Agriculture proceeds energetically to promote the guayule industry, that within less than three years we can expect a large and important addition to our rubber supply; and that within five years the wild rubber shrub could be made to produce most of the rubber needed for our civilian economy as well as our defense."

Should this come to pass, the bloom of the desert might well take the form of the symbol of free people everywhere — the "V" for Victory.

(*On January 15, the Senate, by amending the Downey Bill, raised the area to be planted to guayule from 45,000 acres to 75,000 acres. Furthermore, the Secretary of Agriculture would be authorized to exercise with respect to rubber-bearing plants other than guayule the same powers as are granted with respect to guayule.*)

SCIENCE AND EQUIPMENT

INDIAN PUMPS FOR INCENDIARY BOMBS

A splendid example of how one company which has devoted its efforts for a great many years to forest fire protection has turned its activities toward war work, is that of the D. B. Smith & Company, Utica, New York.

For years their 5-gallon back-pack Indian fire pump has been widely accepted by forest fire protective organizations throughout the country. This company now makes available at small cost an incendiary bomb nozzle which screws on to any Indian fire pump. By adjusting this nozzle it is possible to throw long distance spray instead of a stream. A solid stream on an incendiary bomb has proved a most dangerous method.

Only one person is needed to use the Indian for extinguishing incendiary bombs, whereas three or four are needed for using the stirrup pump. There is also danger of spilling water out of the pail with the stirrup pump, while water cannot be spilled from the Indian, even if the tank is tipped upside down, since the tank has a leak-proof filler cover.

That these fire pumps completely extinguish incendiary bombs has been proven several times at official government tests. They are being used by local, state and federal agencies, and are considered the best hand tool for this work. Only slow, easy working back and forth of the solid brass pump is needed to give a continuous long-distance spray. This heavy spray quickly wets down the bomb and it burns out faster than it would with a fine mist spray from a stirrup pump. A descriptive circular is obtainable from the company.

RAIN CATCHER FOR WOODS FIRES

Andrew H. DeGroff of Little Genesee, New York, has invented a rain catcher and container that can be set up in the woods and used for fighting forest fires. It is an inverted cone-shaped affair to which the knapsack sprayers used by forest rangers in fighting fire can be attached for necessary water supply. A chemical tank attached to the side also makes fire-extinguishing chemicals available. The apparatus, which has won the interest of conservation departments of several states, is particularly adapted for use in hill country where it is usually hard to get water with which to fight fires. The tank has a capacity of 125 gallons.

PORTABLE POWER PUMP

Inspector J. G. MacDonald of the Vancouver Forest District, British Columbia, has developed a new portable power pump designed to give extreme light weight coupled with dependability of operation. Although its output is much less than the portable pumpers used commonly in the United States, Mr. MacDonald believes it has possibilities where the larger pumps are not used.

The revolutionary part of the pump is not the size or weight but the gear-reduction coupling. It was this coupling that permitted the use of a small motor and low speeds. It operates a pump that, directly connected, requires a 3-3½ h.p. motor and operates efficiently below its maximum rating.

NYLON SNELLS

For 1942 tackle manufacturers will offer hooks snelled with nylon, it is announced by E. I. du Pont de Nemours & Company. Hooks snelled with nylon monofilament can be used for all types of bait fishing, both in the stream and on the lake. They have the same superiority over natural gut snells as nylon continuous length leaders have over natural gut leaders.

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SOUTH CAROLINA NAMES NEW STATE FORESTER

W. C. HAMMERLE, assistant state forester, has been named state forester of South Carolina by the State Forestry Commission. He succeeds H. A. Smith, who resigned to become associated with the Department of Forestry of the Tennessee Valley Authority.

A graduate of the New York School of Forestry, Syracuse University, Mr. Hammerle in 1925 entered the United States Forest Service as junior forester, serving in that capacity and as district ranger until 1929 when he became associated with the North Carolina Forest Service. In 1931 he joined the South Carolina Forest Service as district forester, and in 1935 became assistant state forester. Four years later he was named state forester of Georgia, serving in that capacity until 1941 when he returned to South Carolina as assistant state forester. In this position he was responsible for the organization of a large part of the area in the state now under fire protection, and with the aid of the CCC supervised the construction of the first fifty fire observation towers and the first thousand miles of telephone line in the state forestry system.

H. A. Smith, who resigned as state forester late in 1941 to become manager of the Guntersville-Wheeler area of the TVA, is a graduate of the Mont Alto State Forest School of Pennsylvania. After serving with forestry organizations both in Pennsylvania and Florida, he became state forester of South Carolina in 1930. In 1937 he served as president of the Association of State Foresters.

ASSOCIATION ELECTS NEW OFFICERS

MEMBERS of The American Forestry Association by letter ballot during December elected the following new officers: For president, W. S. Rosecrans of Los Angeles, California, was reelected; to the Board of Directors and for a five-year term, Frederick P. Champ of Utah, president, Mortgage Bankers Association of America, to succeed Henry S. Graves; Frank E. Mullen of New York, vice-president and general manager of the National Broadcasting Company, to succeed Dr. John C. Merriam; Dr. Charles E. Holzer of Ohio, president of the Ohio Valley Flood Control Congress, elected for a one-year term, to succeed Vanderbilt Webb, who retired from the Board because of illness.

Vice-presidents elected for 1942 were Horace M. Albright of New York, president, American Planning and Civic Association; Dr. Alfred M. Bailey, director, Colorado Museum of Natural History; Honorable Percival P. Baxter, former Governor of Maine; J. Hammond Brown of Maryland, president, Outdoor Writers Association; Chris L. Christensen, dean of Agriculture, University of Wisconsin; Dr. George E. Condra, dean, Conservation Survey Division, University of Nebraska; Honorable Wall Doxey, United States Senator from Mississippi; Judge Guy B. Findley, president, Ohio Forestry Association; Mrs. T. M. Francis of Alabama, chairman of Conservation, General Federation of Women's Clubs; Dr. John C. Gifford of Florida, professor of Forestry, University of Miami; Henry S. Graves of Connecticut, dean emeritus, Yale School of Forestry; Honorable Charles L. McNary, United States Senator from Oregon; Dr. John C. Merriam of California, president emeritus, Carnegie Institution of Washington; Cecil Miller, president, Arizona Farm Bureau Federation; Arthur Newton Pack of New Mexico, vice-president, Charles Lathrop Pack Forestry Foundation; Archibald Rutledge of South Carolina, author and conservationist; Dr. Henry Schmitz of Minnesota, president, Society of American Foresters; James J. Storrow, vice-president, Massachusetts Forest and Park Association; I. N. Tate of Minnesota, vice-president, National Lumber Manufacturers Association; Mrs. John G. Y. Walker of New Jersey, chairman, Conservation Committee, the Garden Club of America; and O. S. Warden of Montana, president, National Reclamation Association.

WILLAMETTE VALLEY TREE FARMS

A NON-PROFIT organization composed of some of the leading timber operators and lumbermen in the Douglas fir region has been organized as the Willamette Valley Tree Farms for the primary purpose of progressive and cooperative forest management, according to the National Lumber Manufacturers' Association. Member firms included in the organization are: Snellstrom Brothers, Inc.; Booth-Kelley Lumber Company; C. E. Johnson Lumber Corporation; Lewis Lumber Company; Row River Lumber Company.

Having posted their forest properties with signs to inform all who enter that "we are growing trees," the organization is now engaged in the following objectives: first, the study of the problems of fire protection; second, reforestation of logged-over areas and the possibility of placing the lumber industry in Western Oregon on a sustained yield basis; third, the dissemination of information concerning such subjects to the owners of forest lands and the public with a view to educating the owners of such lands and the

public in proper and more scientific forestry methods; fourth, to promote generally the protection and growing of trees and the development of better forestry methods and practices, and, fifth, to make surveys, maps and engineering studies of forests or logged-over lands, by arrangement with the individual or group owners of the lands, and make recommendations respective to management of the forests and to supervise such undertakings, but without profit to the corporation.

A qualified chief forester has been employed and seedlings for reforestation of cut-over lands will be obtained from the Nisqually Flats Nursery operated by the West Coast Lumbermen's Association.

Officers of the Willamette Valley Tree Farms are: Edmund Hayes, Portland, President; Charles Snellstrom, Eugene, Vice President; J. W. Lewis, Dexter, Treasurer; Dean Johnson, Toledo, and Charles G. Briggs, Eugene, members of the Board of Directors. The advisory board includes: Nelson S. Rogers, Oregon State Forester; Warren G. Tilton, forest engineer of the West Coast Lumbermen's Association; Charles Marston, Willamette Valley Forester, West Coast Lumbermen's Association, and W. H. Price, of the Weyerhaeuser Timber Company.

NATIONAL FOREST PURCHASE PROGRAM REACHES EIGHTEEN MILLION ACRES

AN addition of 195,818 acres approved for purchase during the fiscal year July, 1940, through June, 1941, brought the total area of land acquired for national forests since enactment of the Weeks Law of 1911 to nearly eighteen million acres, according to the National Forest Reservation Commission's latest report to Congress.

The eighteen million acres, which are included in the Department of Agriculture's Forest Service timber-growing and watershed protection areas, cost an average of three dollars and seventy-six cents an acre. Purchases during the last fiscal year averaged four dollars and eleven cents an acre.

In its summary the Commission also reported the acquisition of 392,985 acres for which the federal government exchanged 245,843 acres of land and forty-nine million board feet of timber.

While the bulk of the additions to national forests has been made as a result of direct appropriations, considerable areas have been added to the national forests as a result of special Congressional Acts permitting the purchase of lands within boundaries of certain forests from receipts of timber sales, grazing privileges and other uses. Such arrangements now apply to parts of the Uinta, Wasatch and Cache National Forests in Utah, to the Angeles, Sequoia and parts of the San Bernardino and Cleveland National Forests in California, the Ozark and Ouachita National Forests in Arkansas and to the Nevada and Toiyabe National Forests in Nevada.

As a general solution for the nation's forest problems, the National Forest Reservation Commission recommends continued acquisition of land by the public for forest purposes and sufficient control of private forest land practices to protect the public interest.

Postponement of forest land acquisition, the Commission finds, often results in such deterioration and abuse of the cover that the soil itself is impoverished and a forest can be re-established only by expensive planting or long delayed natural regeneration. Extinction of the natural cover and the subsequent loss of the thin layer of mature topsoil may result in plant and tree growth of relatively low economic and social value. Long misuse and abuse of land eventually results in its becoming a public liability and requires a larger investment of time and money to restore productivity than would have been necessary if the land had been acquired at an earlier time.

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THE ALPINE PATROL

(*Continued from page* 71)

ations in the local areas; and to cooperate with, and extend into inaccessible areas the anti-aircraft and anti-parachute warning services."

In other winters, maintenance employees of public utilities, snow survey personnel of governmental agencies, and an occasional ski mountaineer were responsible for most of the ski tracks traversing the remote crests of the Rockies, Cascades, and Sierra Nevadas. This winter, ski patrolmen are leaving other tracks as they guard the country's life lines of wire, rail, and pipe which cross the national forests flanking these barriers. Those patrols remember as they meet King Winter on his own terms the unusual increase a year ago in the number of Japs who frequented ski centers patronized by the cities of the West Coast.

Last winter Americans read of the hardships endured by the Greeks in defending the Albanian mountain frontier. The winter before they followed the dramatic efforts of the Finns to protect their snow-clogged eastern boundary. This year another winter epic may be enacted as our own soldiers prepare for action on any front at any season. The War Department knows full well that this is not a fair weather war and that our troops must be trained and equipped to fight when the going is toughest.

CENTRAL AMERICAN CLOUD JUNGLES

(*Continued from page* 76)

For here among the rain and fog, the most beautiful bird in the world makes its home, laying its two blue eggs in the hollowed-out boles of dead trees in woodpecker fashion. It had been for a glimpse of this bird that I had dragged Chon to the rain forest. Above the bleat of the paterfamilias of a troop of howling monkeys, I heard its song. Like the fluted song of the hilgero it fitted the gloom of the forest. For birds always utter the mood of the landscape and each part of the earth has precisely the bird voices that are in tune with it. This of the quetzal had a melancholy quality to it.

Low and throbbing, the quetzal song began, then it became rhapsodical as the male answered in antiphonal fashion. There was a flash of emerald green and a bird of dazzling red and golden-green broke into the open, fluttering convulsively while dragging its long green tail plumes behind. Its beauty was so unreal that neither photographs nor word-descriptions can begin to etch the picture.

It is not large. The quetzal would hardly outdo in size a pouting pigeon, yet in color and beauty it seems to have encompassed all the colors of the bird world. Translucent green covers its back and laps over the jet-black wings in form of lanceolate-shaped green coverts. The same golden-green feathers form an upstanding crest and continue downward onto the breast forming a solid green shield. From there on without prelude is a breast of startling red.

The glory of the quetzal, however, is its long tail. The actual tail is black and white, but cascading from its back is a series of green feathers, each longer than the first and culminating in a supertail, actually caudal tail-plumes forty inches in length. These were the plumes that the Aztec priests placed in their fantastic head-dresses.

We sat admiring this quetzal, not noticing at first the steady drip, drip, drip of the water. The clouds, for it now was afternoon, were being forced down to "sleep" as Chon insisted, on the mountain. Wisps of moisture-laden clouds drifted by and the drip, drip increased. The quetzal seemed unmindful of us. It sat heavily on a dead branch. The only indication of its being alive was the low metronomic cluck that convulsed its body, sending up with each note a flick of its rapier-long tail.

Then the spectacle ended. A heavy cloud slowly descended like a drop curtail, obscuring the forest and making it as opaque as a Golden Gate fog. We arose, soaked to the skin and groped our way back to the small yellow trail. It was actually no longer a trail, but a flowing brook. The cloud forest was rapidly becoming the rain forest. The atmosphere, long saturated to the dripping stage, had opened its rain cocks. The birds stopped singing and retired to some dry cranny. Butterflies made off hurriedly to take refuge under broad leaves. The immense trees became indistinct shadows on a jungle drop-curtain.

Above the drippings, splashing, and plopping of the rain there was but one sound, that of the screaming howling monkeys. They seemed to be the guardian hosts of this most mysterious forest in the world, the cloud jungles of Central America.

PLUMB SETS NEW WORLD RECORD

15-inch log severed in 47⅕ seconds by Champion Australian Chopper

The winners of all nine events at the chopping contest of the recent Sydney (Australia) Royal Agricultural Show wielded Plumb Axes. In the 15-inch world's championship underhand chop, the winner, using a Plumb, established a new world record.

Note the huge "bites" made by Plumb Axes (right). These contests attract experts from all Australia who choose their axes with great care. Their demand for keen cutting edge, hardness, feel and balance has always made Plumb the favorite.

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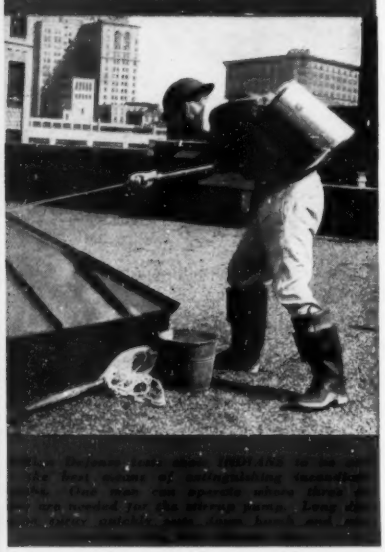

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